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ABSTRACT

This first volume in a four-volume study of industry- and education-driven skill standards in the United States and other countries describes current practice. Chapter I is the executive summary. Chapter II is an overview of historical and current issues that will affect a voluntary network of industry-based skill standards, competencies, and certification systems. Chapter III describes purposes and legal rationale for performing job analysis; alternative techniques; time factors, resources, and skills; and job analysis as typically practiced. Chapter IV lays out issues surrounding assessment as part of a national standards program: legal issues, technical considerations and guidelines for test development, and selected industry practices. Chapter V makes observations on the issue of terminology and common language. Chapter VI describes some key umbrella organizations that accredit accreditors, certify certifiers, or approve testing and assessment instruments. Chapter VII summarizes findings of a survey of state vocational-technical education agencies regarding their involvement in skill standards. Chapter VIII reports findings of a study of the role of national industry and occupation-focused organizations in the skill standards issue. Chapter IX answers six questions to clarify the scope of the roles for the federal government and private sector in the development and implementation of skill standards to improve competitiveness in the global market. The volume contains 71 references and 25 legal citations. (YLB)

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AN OVERVIEW OF SKILL STANDARDS SYSTEMS IN EDUCATION & INDUSTRY

Systems in the U.S. and Abroad

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VOLUME I

THE INSTITUTE FOR EDUCATIONAL LEADERSHIP
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VOLUME I

AN OVERVIEW OF SKILL STANDARDS SYSTEMS IN EDUCATION AND INDUSTRY

THE INSTITUTE FOR EDUCATIONAL LEADERSHIP

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Principal Investigator

With the assistance of

The Center for Policy Research of
the National Governors' Association
The Meridian Corporation
The National Vocational Technical Education Foundation

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Ms. Joan Wills, of the Institute for Educational Leadership served as the Principal Investigator for the project. She also had the lead responsibility for researching the industry based skill programs, providing an overview of the quality assurance organizations, preparing the case study of the United Kingdom, contributing to the case study of Australia, and providing the overview of other countries skill standards systems.

Evelyn Ganzglass and Martin Simon of the National Governors' Association contributed to the effort through review of materials and writing descriptions of industry based skill certification programs. In addition NGA shared with the study team the results of a companion study of nineteen states that are actively involved in the development of skills standards. Dr. Robert Sheets, a consultant to NGA conducted one of the in-depth studies of an industry based credentialling program and provided the case studies of Japan, Denmark and Germany. Mr. Larry Good, a consultant to NGA wrote the executive summary for the study.

Ed Davin of Meridian contributed by writing descriptions of industry based skill certification programs, Dr. Ronald Bird, of Meridian, had responsibility for organizing the information of industry skill standards programs to assess the extent of coverage of the programs within the total workforce. Dr. Eric Rice, of Meridian, had the lead responsibility for the literature search of job analysis and assessment issues, providing one of the case studies of an apprenticeship program, and the case study of Canada and Australia.

Ms. Madeline Hemmings of National Vocational Technical Foundation contributed the materials collected by the Foundation's fifty state survey of education driven skill standards initiatives as well as reviewing materials. Ms. Barbara Border, a consultant to NVTF, had the lead responsibility for preparing Volume II of the report, preparing the summary of chapter regarding education driven skill standard systems, providing the literature review of skill standards in the military, and the use of the DACUM type job analysis in education skill standard programs.

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This four volume study of Industry and Education Driven Skill Standards Systems in the United States and Other Countries was prepared under the direction of Debra Nolan, Office of Vocational and Adult Education of the Department of Education.

Several persons were invited to review the manuscripts, often at the expense of their many other responsibilities. Their thoughtful comments and commitment to quality substantially contributed to this work. From the Office of Vocational and Adult Education they were: Joyce Cook, Howard Hjelm, Glenn Boerrigter, Jackie Friedrich, Mark Schwartz, and Carol Griffiths. From the Office of Planning, Budget, and Evaluation, David Goodwin. From the Office of Education Research and Innovation, Robert Morgan. From the Department of Labor, Michaela Meehan. From the National Occupational Information Coordinating Committee, James Woods and Pam Frugoli. From Aguirre International, Marilyn Silver and Sandra Smith.

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EXECUTIVE SUMMARY

INTRODUCTION

During the past few years, the issue of skill standards has arisen as a core element in the U.S. public debate about how to ensure that education and training endeavors result in a workforce that meets employer needs in an era of global competition. That interest has been stimulated from at least three directions.

First, a few national trade associations such as the Automotive Service Excellence and Associated General Contractors have been working voluntarily for a number of years with state vocational education leaders to improve occupational education and training efforts of schools. Those efforts, while positive, were limited, and state educators have had to reach out to local employers to expand the effort to establish relevant curriculum and measures to assess the competencies students acquired while in school. Today, a wide array of efforts are underway in every state to involve industry representatives in constructing workplace skill requirements. The U.S. Department of Education's Office of Vocational & Adult Education has taken on the crucial responsibility of assisting the states and industries in that effort.

Second, efforts to improve the quality of training programs -- ranging from the classic work-based apprenticeship programs to the second chance training programs -- led the U.S. Department of Labor to the same conclusion reached in the vocational education arena. Skill standards, driven by industry, were needed. Without them, it would never be possible to measure the effectiveness of programs and judge the value of public and private investments in training.

Third, the bipartisan Commission on the Skills of the American Workforce gave the nascent movement an important boost in its influential 1990 report *America's Choice: High Skills or Low Wages!* Successful international competitors, said the Commission, had national systems and structures that involved industries in the development and implementation of education and training for large portions of the workforce. Among major industrial nations, only the United States lacks such a system, the Commission found.

With this convergence of forces the federal government launched a collaborative effort between the two federal agencies to promote the development of a voluntary national skill standards effort that brings to the table all of the stakeholders, including industry associations, unions, and educators from both secondary and postsecondary levels. It represents a substantial effort.

This report is part of that effort. The Office of Vocational and Adult Education recognized there was a critical need to first know what is happening in this country before it would be possible to pull together all of the pieces within a coherent national framework. It brings together, for the first time, explanatory materials regarding what is currently underway within all of the states as well as within trade and professional associations regarding the utilization of skill standards systems.

This is a descriptive report. It focuses on what is. It does not address the issues of quality or value. While voluminous, it is only a beginning.

What was found was a great deal of effort currently underway in a wide array of quarters. There is a rich base to build upon as the federal government moves forward to develop a national framework for the further development of a voluntary system of skill standards that will meet the needs of employers and future and current employees.

However, despite the activity already underway, serious gaps are found in the current practice in this country, including:

- ▸Few skill standards systems include levels that can assist an individual in moving from novice to master in his or her preferred occupation.
- ▸In some of our most important competitive sectors, little or no work has been undertaken to develop nationwide skill standards.
- ▸A crazy quilt pattern of financing the components of the system exists today, raising questions about both the cost efficiency and effectiveness of our current system.
- ▸The infrastructure has not adequately supported the development and upgrading of one of the most important components of a high quality skill standards system -- the instructors.
- ▸There is no common agreement about what is included in a definition of an industry or an occupational grouping or cluster, leading to confusion across the varied skill standards efforts.

One of the current goals of the federal government skill standards effort is to benchmark the standards against world class competitors. It became increasingly clear as this study progressed that in many cases this is already occurring. Indeed, it is obvious that some American trade associations and education and training efforts are the worldwide pacesetters. The technical processes used to conduct job analysis and assessments in this country are being copied all over the world. In other words, we have the technical know-how. We do not have the efficient, effective and understandable overarching framework within which the skill standards systems can thrive. In the parlance of the quality management experts, we lack a common language and common procedures to promote the continuous improvement of the system(s).

This is a "first ever" undertaking; in order to develop a common framework that crosses the boundaries of the public and private sectors and considers multiple variations within both of those sectors a set of ten organizational topics were developed to organize the materials.

1. A Description of the Individual Program or System(s) -- This includes an overview of existing systems, description of the functional purposes for their development (e.g., individual certification and curriculum development), identification of target populations, prerequisites for access to the system (e.g., participation in training, work experience), courses of study and levels of certification, and management issues such as administrative authority and financing of the system.
2. The Extent of Coverage by the System(s) -- The range of industries and occupations covered by existing systems, the overlap between industries and occupations, an estimation of the number of

workers included, and how the coverage coincides with educational activity and government regulation of the occupation and industry.

For these two topical areas every attempt has been made to be as comprehensive as possible, particularly for those occupations that have not traditionally required a four year college degree. This focus was selected by the federal government due to the continuing and mounting concerns articulated by business and industry representatives that a serious erosion of qualified entry level workers is permeating the U.S. labor force.

To fully understand the evolution of both industry-driven and education-driven systems, additional information is provided, where available, that includes the following topics.

3. The Historical Development of the System(s) -- This includes the driving forces or incentives, what barriers were encountered, and the time factors for achieving current levels of usage and coverage.

4. The Partners' Roles and Responsibilities -- The varying roles and reasons for involvement of educational systems and institutions, industry associations and employers, accrediting bodies, labor organizations, general government, apprenticeship programs and other relevant bodies in establishing the skill standards systems.

5. The Standards Setting Processes -- The methods used in setting skill standards, including who is involved and the time, resources and staff capabilities needed.

6. The Occupational Analysis Processes -- How occupations are classified and what approaches are used in determining the specific job requirements for a single occupation or common grouping of occupations.

7. The Assessment Processes -- The procedures, instruments, processes and types of anticipated outcomes vary and will be described. Specific topics include types of testing and selection processes, relationships to instruction, associated costs, methodologies to assure consistency and integrity, methodologies used to insure against discrimination and other legal limitations, and approaches for maintaining and updating the assessment processes.

8. The Instructional Approaches -- Four major topics are explored: the development of curriculum, the delivery of curricula, the selection and training of instructors, and the type of sites used for the delivery of instruction.

9. Maintaining and Updating Skill Standards -- The factors that affect the maintenance and updating of standards, including the time, resources and staff needed.

10. How Information is Shared and Used in Skill Standards Systems -- How, what and with whom information is shared by various partners and external groups. How skill standards are used by employers in hiring and promotion practices, by educators/trainers in setting program outcomes and performance standards, in curriculum development and instruction, by government in establishing regulations and licensure policy, and by accrediting organizations.

JOB ANALYSIS

Job analysis is fundamental to an investigation of industry standards. It provides a "reality check", not only on what workers do as work, but also on the quality of their work performance.

Job analysis is the systematic gathering, documenting, and analyzing of information about employees acting to perform the tasks incumbent to their jobs within any kind of a work setting. Analysis deals with job content, job requirements as well as the context of the entire work organization.

Among the purposes for which job analysis information is used are job descriptions, job evaluation and classification, performance appraisal, training design, work design and selection/promotion systems.

Job analysis is critical to employment decisions because it is the foundation upon which employment tests -- and inferences based upon test scores -- are built. Job analysis establishes validity under the Uniform Guidelines regarding the Civil Rights Act of 1964. Three types of validity are presented as legitimate in the Guidelines: (a) content; (b) criterion-related; and (c) construct. Content validity is the degree to which some sample of tasks, questions, samples, or items on an assessment accurately represents the defined universe of possible content. Criterion-related validity is the degree to which the scores on a test accurately correspond to the performance, knowledge, and skills of those at work. Construct validity is the degree to which the scores on a test accurately measure a psychological characteristic of interest.

Job analysis techniques are the formal procedures that researchers follow in order to obtain and analyze information about specific jobs. Cornelius (1988) determined that the components of the job analysis process fall into four broad categories: sources of job data; methods of obtaining job data; type of job descriptor; and purpose of the analysis.

Since the 1950's, a number of specific techniques have been devised. Six major ones are:

1. Functional Job Analysis -- Trained analysts investigate the interactions among work, workers, and work organization through a multi-dimensional information collection process. FJA is used extensively throughout industry in managerial, professional and craft situations to classify jobs, generate work sample tests and to develop performance standards for work.
2. Critical Incident Technique -- Analysts identify critical incidents that illustrate behaviors that are effective or ineffective in accomplishing the aims of the job. Critical incidents are then classified into categories of behavior. CIT is typically used as a supplemental data collection technique to another method. It is time consuming, requires someone with special training, and produces data that is not necessarily representative of the range of tasks performed in the occupation.
3. Position Analysis Questionnaire -- The PAQ questionnaire uses almost 200 elements of job activity organized into broad categories. It is a combination of contextual information, content and work requirements, and allows derivation of job dimension scores for occupations. The PAQ has been used to create compensation programs and perform job evaluations.

4. Developing a Curriculum -- DACUM is a newer technique, originated in Canada and popularized by vocational education in the United States. The DACUM process involves role incumbents and supervisors for up to several days with a trained facilitator to generate the information. The result is a listing of tasks and activities for any particular job. According to Dr. Robert Norton of Ohio State University, DACUM operates on three assumptions: (a) expert workers can define their job more accurately than anyone else; (b) an effective way to describe a job is to define the tasks expert workers perform; and (c) all tasks demand certain knowledge, skills, tools, and attitudes in order to be performed correctly.

5. Job Task Inventory (CODAP and the Extended Search) -- CODAP is a computer analyzed job task inventory approach. Its most frequent use is to plan and/or adjust training programs so they more accurately reflect the actual practice of work.

6. Observation -- Direct observation provides depth of analysis, validity and flexibility. However, it is time consuming, difficult to analyze, and susceptible to subjectivity.

ASSESSMENT

Assessment and testing is fundamental to any conception of a national standards program. Standards programs in other industrialized nations include assessment as a necessary step to certify the skills and knowledge of individual trainees. In addition, the information assessment provides is necessary to determine the effectiveness of the training programs as well as the accuracy and usefulness of the standards program itself. Finally, testing and assessment is a necessary ingredient to permit the match of pools of skilled workers and employer manpower needs within labor markets.

Legal Issues

It has become axiomatic that if you have an assessment, testing and certification program, then someone will sue you. Understanding the legal issues associated with assessment is crucial to making effective, legally supportable policy choices.

Perhaps the most important law affecting assessment is the Civil Rights Act of 1964, as amended. The key concept emanating from Title VII of that act is known as "adverse impact": when neutral-appearing selection criteria have the effect of discriminating against a protected class. The U.S. Supreme Court has held that if a test has adverse impact, the test must be shown to be valid to be used. A series of guidelines have emerged from case law:

1. An employer's test must be based upon a thorough job analysis.
2. The link between the job analysis and the test content must be established.
3. The content validity of the test must include results from the job analysis that indicate the relative importance of the identified work behaviors.
4. Tests must provide for adequate agreement among raters of applicants.
5. Ratings should be based on performance dimensions, not personality traits.

Even with these and other guidelines, it is important to note that reviews of court rulings make it clear that the courts have not agreed on a uniform set of standards for what assessments are legal and which are not. But the evidence to date argues to only use methods and tests whose validity can be established through some form of job analysis.

A second important legal issue related to assessment comes within the National Labor Relations Act. In the organized sector, labor unions must be included with an equal voice in the creation of standards and assessment systems.

Third, the Americans with Disabilities Act of 1990 prohibits any standards process that involves assessment and certification from discriminating on the basis of disability. The test itself must not assess the disability, but rather skills and knowledge appropriate to the job.

A last area of legislation with implications for national skill standards and certification systems is tied to licensing. If government takes the lead in establishing national standards and credentials that limit people's entry into or advancement within certain kinds of occupations, then the entire process may be subject not only to Civil Rights Act claims but also to "equal protection and due process" claims under the 5th and 14th Amendments. If the scheme if voluntary, due process does not apply.

Test Development Guidelines

The technical standards for test development, contained in the American Psychological Association's Standards for Educational and Psychological Testing (1985) offer the following guidelines:

1. Test content and performance criteria must be based on a thorough job analysis.
2. One must prepare a specification document in which is set forth all the rules for developing the assessment.
3. Competent persons need to be involved in developing the test items and situations.
4. Assemble the examination form from the items and situations created in the assessment pool and based on the directions provided in the Specification Manual.
5. Develop criteria measures to differentiate between those that succeed in the assessment and those that do not succeed in the assessment.
6. Establish procedures for insuring fairness for those being assessed.
7. Train raters and establish inter-rater reliability.
8. A test administration manual should be provided that insures a standard operating procedure for giving the assessment.
9. Directions must be provided on analyzing and reporting the information.
10. Provide explanations of formal procedures for test analysis and review.
11. Provide for examination security.
12. Develop and maintain specific information on each type of validity necessary to support the test.

Industry Practices in Assessment

Business and industry use many types of procedures as assessments in order to make employment decisions about candidate selection and promotions. Riley and Warech suggest there are at least 18 different types of assessments used by American employers, as illustrated in Table 1.

Table #1
Types of Assessments or Tests Used by American Employers*

1. Paper and Pencil Tests
2. Work Samples
3. Assessment Centers
4. Trainability Tests
5. Interviews
6. Peer Evaluations
7. Self-Assessments
8. Bio Data
9. Grades and Educational Achievement
10. Reference Checks
11. Seniority Systems
12. Personality Tests
13. Projective Techniques
14. Individual Assessment by Experts
15. Scored Training and Experience Evaluation
16. Handwriting Analysis
17. Tests of Physical Ability
18. Integrity Tests

***Source**: Richard R. Reilly and Michael A. Warech. (1988). The Validity and Fairness of Alternative Predictors of Occupational Performance. Berkeley: Center for Behavioral Studies at the University of California, 1988.

As comprehensive as this list is, it ignores two methods frequently used by employers: on-the-job assessment of actual practice which is frequently used by apprenticeship programs; and portfolio assessment or the intentional inspection of work products against some criteria to determine proficiency.

Historically, employers have relied on the paper and pencil type tests as their primary means of assessment. In general, paper and pencil tests for certification have distinct advantages and disadvantages. Advantages include allowing sponsors/test developers to provide excellent statistics on reliability, great ease of administration, and comparable practice for scoring. However, often they do not accurately reflect content validity in an occupational setting because they emphasize school learned information, deal with verbal type of information and emphasize recall. It is very difficult, although not impossible, to assess skills. Such tests are expensive to develop although relatively inexpensive to use.

In apprenticeships, on-the-job assessment occurs on three levels. First, work hours are recorded and reported to the Joint Apprenticeship and Training Committee for each apprentice. Second, the apprentice's ability to do that work is recorded because the apprentice must continue to work successfully on the trade practice to keep his/her job. Third, the apprentice is required to attend related instructional courses.

While a number of apprentice programs are adding to these three traditional assessments by moving toward work sample types of assessment that might be termed "authentic assessment", one should not assume that paper and pencil tests are unusable, inappropriate or without validity. They are useful, especially in combination with other types of tests. Furthermore, even the "authentic" assessments have difficulties in insuring that each observer will rate a behavior the same way. Perhaps an even greater concern is the cost of providing work sample performance assessments.

TERMINOLOGY MATTERS

During the course of this study it became increasingly obvious that in this area of emerging public attention and policy development a great amount of confusion exists simply due to the lack of a common language. Common understandings and common frames of reference will be essential as the skill standards initiative moves forward.

The following are examples of terminology issues that surfaced during this study:

▸Standards -- among the dimensions of variation in use of this term are time vs. skill, minimum qualifications vs. optimal performance.

▸Certification -- refers to both achievement of minimum qualifications for entry into an occupation and to achievement of specialty skills.

▸Performance Tests -- some use the term narrowly to refer to demonstration of ability to complete work-simulation tasks while others use it broadly to refer to any type of individual assessment.

▸Job Analysis -- A series of terms are often used synonymously: job analysis, work analysis and occupational analysis. Sometimes job analysis is used as a subset of a larger clustering under the term occupational analysis. Another term, "task analysis" is frequently intermingled, either as a synonym for job analysis or as a discrete step in the job analysis process.

▸Skill -- While the term basically means the ability to do something, confusion often surrounds its usage. For example, referring to a discrete behavior vs. an entire set of performances.

- Certification -- Generally used to refer to voluntary, non-governmental recognition of individuals. Certification may require only minimum competency levels, or may recognize advanced levels of accomplishment or proficiency.
- Accreditation -- Applies to programs within institutions, rather than to individuals. Generally a voluntary form of recognition granted by an agency or association to programs or organizations that meet established standards.
- Skill Standards -- Varied definitions of this term are used. One common one from education is that skill standards are workplace knowledge, skills and attitudes required for acceptable job performance. Many states simply use "skill standards" and "competencies" synonymously.

THE QUALITY ASSURANCE PARTNERS

America has placed a heavy reliance upon a network of predominantly voluntary organizations to promote self-regulation of the education and certification systems. Adherence to the criteria promulgated by any of the following organizations' rules and standards are strictly voluntary on the part of any individual institution or organization. However, their influence over the accreditation and certification systems are strong and their experiences and expertise represent a rich foundation that can contribute to the development of a voluntary skill standards system for the country.

Education and Accreditation Overseers

The American Council on Education, composed of 1,500 institutions of higher learning is an umbrella organization that focuses on all aspects of postsecondary education. It operates through a variety of voluntary commissions and centers. Its Commission on Educational Credit and Credentials guides the operations of the educational community in this country, ensuring the integrity of academic credit and credentialing as well as recognition of adult learning.

The Council collaborates with the Council for Adult and Experiential Learning, an independent organization that promotes recognition of prior learning assessment gained outside the classroom.

The Council on Postsecondary Accreditation [1] serves as an umbrella standards setting organization for education institutions voluntarily seeking either institutional recognition or to have specific programs recognized by a specialized accrediting body. There are regional and national accrediting bodies recognized by COPA and the U.S. Department of Education.

This is a period of some turmoil within the accreditation community as they attempt to sort out the appropriate role of accrediting bodies in terms of measuring institutional effectiveness. Traditional accreditation measures have focused on "input" criteria such as adequacy of faculty or facility. There is

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* **Note**: In the spring of 1993, COPA voted to dissolve itself. As of this writing, key organizations involved in accreditation are exploring alternative organized structures.

now movement toward requiring institutions to have some form of measuring outcomes such as showing how many of their students were able to pass a nationally recognized certification exam.

Certifiers' Overseers

The American National Standards Institute (ANSI), formed in 1918, is an umbrella organization that approves standards established by technical and professional societies, trade associations and individual companies. Over 9,500 standards have been approved by ANSI, mostly for products. ANSI is the U.S. member of the International Organization for Standards (ISO). All of the other countries are represented by the central governments. ISO standards, while voluntary, are increasingly being used to assure conformance of products and services across international boundaries. The ISO 9000 series is a set of technical documents that put forth criteria focused on quality assurance. Embedded in these standards are criteria related to the quality of the workforce. Companies wanting to participate in the European market are increasingly being required to show proof that workers have the appropriate credentials to perform their jobs.

ANSI's criteria for approving any accreditation program include (but are not limited to):

- Be operated by a certification body with independent third-party status;
- Have clear procedural guidelines;
- Provide full disclosure of information about the accreditation activity; and
- Have an annual review of the program by ANSI.

A second overseer, the National Commission for Certifying Agencies, was created in 1989. It was established by the parent National Organization for Competency Assurance to establish national voluntary standards for and recognize compliance with those standards by agencies certifying individuals in a wide range of professions and occupations. The parent NOCA is a membership organization whose mission is to provide a forum for all types of practitioners and organizations interested in competency assurance and certification. Members include employers, state licensing boards, educators, federal agencies, test developers, consumer groups, certifying agencies and professional associations.

NCCA criteria for being eligible for review include:

- The program shall be nongovernmental unless the certification is for government employees;
- Must be national in scope;
- Program must be operated by a not-for-profit agency;
- The program shall have completed at least two national examination administrations prior to seeking NCCA approval;
- Program must be administratively independent; and
- There must be alternative pathways for individuals seeking certification.

EDUCATION-DRIVEN SKILL STANDARDS SYSTEMS

The industrial changes of the past 20 years have pushed forward a process of change in the skills required of workers, which has brought changes to skill standards setting. Starting in the seventies and picking up speed in the eighties a new competency based system emerged.

Occupational skill standards have been established primarily through the efforts of state level vocational-technical education. The 1990 reauthorization of the vocational education act, popularly known as Perkins II, provides for the first time fiscal support for national occupational standards as well as encouraging further state work through requirements for performance standards and Technical Preparation programs.

Several consortia of states have been formed over the years to encourage collaboration on occupational skill standards. In this section, occupational skill standards will be used synonymously with competencies. Tasks will be referred to as components of skill standards.

The educational development of occupational skill standards has been driven by the specific needs of industry. Vocational-technical education's primary approach has been to use occupational skill standards to develop task lists as the basic units of curriculum, instruction and evaluation criteria to ensure that students acquire the needed skills for jobs. The study found that approximately 700 committees using industry volunteers exist across the country.

The study team surveyed state vocational-technical education agencies to learn about their involvement in skill standards. The following summarizes those findings.

Purposes for development:

- Curriculum development -- 48 states;
- Guidelines for programs or courses -- 46 states;
- Assessing student mastery -- 29 states.

Initiators:

In most states, education was the originator of the development of occupational skill standards. Only in seven states was business and industry cited as an originator.

Influence on course of study:

- Articulation between secondary and postsecondary programs -- 47 states;
- Development of course syllabi -- 44 states;
- Program certificates of mastery -- 36 states;
- Testing and assessing skills acquired -- 42 states.

Partnerships:

- Asking industry managers to help form occupational skill standards committees -- 41 states;
- Using incumbent workers or supervisors in the standards committees -- 43 states;
- Using instructors from the occupational field in the study -- 40 states;
- Including academic instructors -- 28 states;
- Using curriculum developers to work with occupational skill standards -- 35 states.

Financing development:

- Federal vocational education funds -- 49 states;
- State funds in addition to federal -- 34 states;
- Business and industry funding -- 16 states.

States have spent widely varying amounts on occupational skill standards development. The range is between $3,000 and $20,000 per occupational cluster. Approximately three quarters of the states are committed to funding ongoing maintenance and revision of occupational skill standards and related task lists. Most state development occurs as part of a consortium, such as the Vocational Technical Education Consortium of the States (V-TECS), with member states regularly adding to the pool of standards and task lists. Each year updating is required in some areas, particularly in occupations with changing technologies, such as printing, electronics, manufacturing, automotive and health specialties. Keeping those lists up to date is one of the greatest concerns of education and its partners.

No one set of skill standards has been established for all states or is used by every state. Extensive lists of occupational skill standards are available across the nation. However, only 26 to 32 states use a common set of standards for any one occupation.

Starting point for standards setting and occupational analysis:

- V-TECS catalogs -- 38 states;
- Consortium lists and materials -- 33 states;
- Business and industry lists -- 37 states;
- Previous state and local standards -- 30 states;
- Apprenticeship lists -- 21 states.

Process for development of standards:

Most states use a process involving input from workers in jobs for which the standards are being developed. The most common is DACUM or modified DACUM -- 34 states; other industry methods -- 29 states; and V-TECS or modified V-TECS -- 26 states.

Methods of assessment used:

- Written cognitive tests -- 41 states (only half using computerized versions);
- Simulation -- 26 states (with 23 using situational tests);
- Performance tests -- 38 states;
- Combination of above -- nearly half.

Most states also include in their assessments of vocational-technical students mastery of academic competencies in math, communication, science and reading as well as employment related skills such as problem solving, resume and application, and human relations on the job.

Use of the standards:

The greatest usage of the occupational skill standards is by local districts. Partnerships with business, industry, apprenticeship and Job Training Partnership Act (JTPA) programs provide an opportunity to share occupational skill standards as a common base for skill development and employment practices.

Strong links are emerging between occupational skill requirements for individuals and performance standards for vocational-technical education programs established under Perkins II. Thus far, 33 states require local programs through performance standards to use occupational skills and competencies.

Barriers to be addressed:

A number of obstacles must be overcome to take full advantage of the work done thus far within vocational-technical education to assist development of a national voluntary system of skill standards. Major ones include:

- Assuring that the instructional staff (both academic and vocational) is sufficiently knowledgeable of the needs of industry;
- Development of a more sufficient and affordable assessment system that carries with it the portability deemed of value by industry;
- Encouraging expanding usage by more local school districts and other education and training providers.

Volume II of the report contains nine case studies of state activities regarding occupational skill standards as well as the complete survey results from all 50 states.

INDUSTRY DRIVEN SKILL STANDARDS SYSTEMS

In addition to their work with vocational-technical educators, industry is involved through other venues in the skill standards issue. The focus of this section is on the role of national industry and occupation focused organizations. It is important to note at the outset that "skill standard" has traditionally been a technical term, not a policy term. Policy discussions tend to use the term "credentialing", and what follows discusses the issue using that term.

Credentialing activities can include:

1. Prescribing education and experience qualification for certification candidates;
2. Establishing for potential accredited institutions qualifications for curriculum, faculty, and facilities;
3. Administering competitive exams; and
4. Conducting assessment visits.

Industry groups have taken on these actions in many sectors as a self-regulating, privately-driven action. The essence of the arguments for such actions is that self-regulation prevents costly and cumbersome government regulation and that the privately-driven approach requires the providers of the service to stay close to changes in the marketplace.

Self-regulation of credentialing is very much an American strategy. By far the most typical pattern in other industrialized countries is for government to perform the credentialing functions.

This study focuses on occupations not normally requiring a four-year college degree or more as minimum entrance requirements and on national trade associations that directly provide or indirectly sponsor a certification service. The journeyman card represents a form of certification that does not fit into the trade/professional association category. However, the apprenticeship and upgrading programs jointly sponsored by labor/management committees were considered part of the industry driven skill standards development "system" for purposes of this study. The research does not include firm-specific skill standards or apprenticeships.

Volume III of the report contains the detailed descriptions of each industry-based certification system our research uncovered. The following highlights some of the key findings.

Gaps and Coverage

There are major industry sectors that do not have a tradition of promoting industry-wide skill standards such as agriculture, mining, retailing and large portions of manufacturing. In manufacturing, firms are often involved in firm-specific apprenticeship training programs for which the course of study and certification may or may not reflect cross enterprise standards. See Table 2.

By far the largest number of certification programs are directly related to occupations and industries where there has been (a) intervention by government to regulate the industry or (b) the threat of government regulation. Certification of individuals has been chosen as the route for self-regulation by the affected industries. Health care and real estate are examples of the first type and direct selling is an example of the latter type.

Most certification programs reflect specialties or market niches.

The Role of Industry Associations

In very few instances was there found a single industry association that represented the total industry, offering the only certification program used by all of that industry. This isn't surprising, given that most industry associations are themselves specialty organizations.

There is a strong pattern of influence that emanates from a primary profession such as engineering, accountancy, or medical over the certification programs that recognize the technical workers within the same field. For example, many of the allied health fields are clearly modeled after the medical or dental preparation programs for doctors.

Characteristics of the Certification Programs

In many ways the current state of affairs means that the old adage "let the buyer beware" holds sway when discussing certification and credentialing programs. This observation is made not to pass judgement on any organization or institution, but simply to note that one cannot assume that a person claiming to be certified or credentialed has completed an assessment of skills and knowledge in a program that has validated the standards or the assessment instruments.

The Patterns of Practice

There are some common patterns in the certification systems:

1. Most programs offer only one or two recognitions;
2. Most are linked to time in the workplace;
3. Most have alternate paths that allow candidates to credit schooling with less time spent in the workplace to qualify for assessment;
4. The overwhelming model is to assess knowledge through passing a paper and pencil test;
5. Most have some form of required recertification based on continuing education and professional development activities;
6. Most have permitted a time limited period for "grandfathering" members of the profession without requiring the individual to sit for exams;
7. Most have developed a core body of knowledge that is required in order to minimally qualify for being considered a candidate;
8. Some have established linkages with recognized organizations such as the American Council on Education in order to have the passage of an exam count for college credit.

Management and Financial Issues

It is often the case that non-profit organizations are established by a single trade association or, in some cases, by several trade associations to support research, development and certification program cost. In some instances, these non-profit organizations have the responsibility to set product standards as well as establish skill standards for individual certifications.

Recertification is becoming a larger issue for many of the programs as a result of technology changes, yet many have found members resistent to the requirement that some form of testing be part of the continued recognition. Without the passage of some test and other assessment of skills it is necessary

Table 2 shows the extent of coverage of the certification programs identified through the study.

Table 2
Existence of Skills Certification Programs
Numbers in cells are counts of certification programs
(Shading indicates industry sectors having less than 5% of indicated occupation employment)

Occupation Group	Industry												
	Agric.	Mining	Constr.	Manuf.	Transp	Comm.	Wholes. Trade	Retail Trade	Fin. Insur.& Real Estate	Serv.	Govt	Non specific	Total
Executive, Admin & Mgmt.	▨ 1	▨	2	2	▨ 1	▨ 1		4	9	23	1	12	56
Professional Specialty	▨	▨ 1	▨	2	▨	▨	▨	▨	▨ 3	21	3	1	31
Technicians	▨	▨	▨		▨	▨ 1	▨	▨	▨	14		1	16
Marketing	▨	▨	▨		▨	▨	1		11	7	▨		19
Admin support	▨	▨	▨		▨	▨			2	1		6	9
Service	▨	▨	▨	▨	▨	▨	▨		▨	6			6
Agriculture		▨	▨	▨	▨	▨	▨	▨	▨	1			1
Precision Production	▨	▨	7	2	▨		▨	4	▨	11			24
Operators	▨	▨		4	1	▨			▨	1	▨		6
Non-Specific													
Total	1	1	9	10	2	2	1	8	25	85	4	20	168

for the sponsoring certifying agency to keep records of proof that the individual has complied with recertification requirements.

In any voluntary certification program, promotion is a management task. Individuals must be encouraged to become participants and employers must be encouraged to utilize the certification in their hiring and promotion practices and policies.

One of the most impressive features of certification programs is the willingness of volunteers to contribute substantial time and energy to support the effort. However, volunteers cannot do it all. Most programs are able to eventually become self-sustaining by charging a variety of fees for different parts of the certification program.

Speed of development is directly related to whether up-front seed money is provided by the parent trade association or professional society.

The total cost varies, but several hundred thousands of dollars are required (including voluntary time of experts) to launch a substantial and credible program.

Program Recognition or Accreditation

One of the stated goals of the federal government's initiative is to promote a competency-based system that builds into the education and training curricula the workforce skill and knowledge requirements identified by industry. This goal, if realized, will represent a sharp break with current practices, which focus largely on input measures in combination with time-of-study measures, not competency attainment.

The typical pattern promoted by industry when supporting accreditation programs has been to develop agreement among educators and themselves regarding what is often called the common body of knowledge required to practice in a profession, and to then ensure both that courses contain that knowledge and that the educational institution provides qualified faculty, adequate equipment and other key inputs. Accreditation usually begins with a self-assessment process followed by a peer review organized by the sponsoring body.

Apprenticeship programs are similarly focused around a common body of knowledge, type of equipment and qualifications of instructors -- all input measures.

Both of these traditional quality assurance forms also have in common a program that is essentially time-based.

There are only limited examples of national organizations that are attempting competency-based approaches now. However, it is instructive to note that a substantial number of industry trade associations that are deeply involved in sponsorship of accreditation programs are also involved in a certification of an individual's competencies in a separate program effort. As one individual interviewed stated succinctly, an accredited program only allows an individual to learn, while the certification testing process finds out what they learned.

Apprenticeships

The costs for the apprenticeship model of credentialing is often supported by a self-imposed tax that employers pay as a result of collective bargaining agreements or by the choice to sponsor such a program. In most joint union/employer sponsored programs, apprentices do not bear any of the related training costs nor are testing fees required.

There are no requirements that an approved program include such quality assurance mechanisms as testing or performance measurement and that has, in some instances, caused problems in the "portability of the credential" from one community or state to another.

Concern about Instructors

The qualifications of instructors is a theme of concern that permeates almost all of the industry associations that are involved with any form of credentialing.

Several of the national apprenticeship programs invest considerable time and energy in preparing experienced industry workers to perform the all-important task of providing the related instruction. Many of the industry certification programs have developed a screening mechanism to vouch for the quality of instructors that can be used in their own education programs.

In some cases, educational tenure policies are sharply criticized by members of industry who are not convinced that all of the instructors have "kept up" with the changes in the occupation or industry.

The quality of work site instruction is a related and important issue. Often, the individual who is the work site supervisor must be "certified" themselves in order for the student to gain the necessary credits for graduation or progression.

Relationship to Licensing

Complex is the operative word regarding the relationship of licensing and voluntary credentialing systems. It is often the case that associations representing a particular occupation aggressively seek the governmental blessing of requiring licensure as a way of controlling entry into the practice of the occupation or to help members address potential health and safety liability legal claims.

At the same time, there are obviously mixed opinions about the role of government, often resulting in contentious debates.

It is worth noting that many voluntary certification and accreditation organizations have close working relationships with state licensure boards.

Unsettled and Continuing Issues

Important issues emanating from examining the current industry credentialing practices include:

- There is no common framework or language between and among the programs and the education community at large, let alone among the general public.
- Few credentialing programs are targeted at the entry-level workforce.

- Competition among professional associations, certifying/accrediting groups and even licensure bodies is a concern. An example: 21 organizations offer nursing certification, a proliferation that has led to some duplication.
- Unwillingness of specialized accreditation bodies to recognize either course work in a related field or experience gained on the job.

OVERVIEW OF SKILL STANDARDS SYSTEMS IN SELECTED COUNTRIES

The study team reviewed the skill standards systems in six countries representing a range of approaches: Australia, Canada, Denmark, Germany, Japan and the United Kingdom. These tend to break into three categories:

1. The "initial preparation" model represented by Germany and Denmark focuses on the school-to-work transition for young people.
2. The "craft certification" approach represented by Japan and Canada meets the needs of more mobile workers.
3. The "comprehensive" model found in the United Kingdom and Australia is the youngest and still emerging category.

In looking at these six countries, three important differences between the United States and all of them should be noted:

Gap 1 -- Most other countries are more advanced than the U.S. in terms of supporting education and/or work-based skill standards systems.

Gap 2 -- In each of the other countries studied an exit from compulsory school examination system is in operation, often used to sort people, a strategy the U.S. has eschewed.

Gap 3 -- In the other nations, there has been a long history of the central government supporting and promoting a third party certification of skills and knowledge gained through the vocational preparation process, including formal mechanisms to involve industry and employee representatives.

Volume IV of this study describes all six nations' strategies in some detail. Listed below are some key findings.

Initial Preparation Models -- Denmark and Germany

Both of these nations' frameworks are school-to-work transition models, and both have long histories of involving industry in the education and training of the workforce. Both have been firm regarding the critical role of industry in establishing standards and in designing and implementing certification of skills.

The role and structure of national standards in the basic vocational education and training system in Denmark offers an interesting model for U.S. consideration. The German Dual System is a leading international example of a school-to-work transition system based on national skill standards.

Craft Models -- Canada and Japan

The critical feature that ties Canada and Japan together within the skill standards systems is the focus each has placed on the development of skill certification systems for the occupations that have a substantial amount of mobility across jurisdictions -- the crafts and trades.

Both countries have "wrap-around" support systems for the entities that have the lead responsibilities for occupational preparation of the workforce. However, due to fundamental differences in the placement of the center of responsibility for training the workforce -- in Japan it is the employers and in Canada the individual provinces -- the central government support systems have different design characteristics.

National skill standards in Japan are driven largely by government and employer organizations, and focus heavily on incumbent workers. Canada excels at establishing both a common language and portable credentials.

Comprehensive Models -- United Kingdom and Australia

Clearly the most ambitious and, perhaps radical, of the skill standards systems can be found in English speaking countries within the United Kingdom and the Commonwealth member state, Australia.

In both instances, prior to the 1980's the traditional role of the central government could be characterized as laissez-faire in the arena of promotion of skill standards. During the past decade, however, there has been a dramatic shift. In these countries, the promulgation of skill standards and certification systems are viewed as central to the competitiveness strategy of the overall economies.

The development of industry driven skill standard systems are having direct impact on the organization and structure of vocational preparation institutions. Also, the traditional academic education systems are experiencing changes due to the establishment of the skill standards systems.

Australia and the United Kingdom offer comprehensive models that have many parallels to the process emerging in the United States and therefore contain relevant framework and technical lessons to be considered.

Lessons for Developing Skill Standards Systems

There are a series of lessons that one can discern from investigating the standard setting process in other countries:

- An open and clearly understood process is needed to conduct consultations among the stakeholders;
- The government has a powerful role to play, particularly as an advocate and promoter of the process;
- Industries must be responsible for developing the standards;
- Fiscal support from the government is required to assist the industries in the development of standards that are to have nationwide applicability;

- The standard setting process is facilitated by creating a standardized language and format that must be followed in creating national standards;
- The standard setting process is, in fact, a political and negotiated process;
- There must be education led processes established to facilitate the transformation of standards into curriculum; and
- The standards generate the need to realign intergovernmental systems.

RECOMMENDATIONS AND CONCLUSIONS

All of the research leads to a question: What does this imply for the further development of a voluntary skill standards system in the United States. The U.S. Department of Education asked the research group to explicitly answer six questions to help understand the scope of the roles for the federal government and the private sector in the development and implementation of skill standards to improve U.S. competitiveness in the global market. The six questions are:

1. What roles should industry and the federal government play in developing a nationwide system of skill standards?
2. What arrangements must the federal government adopt to encourage industry to become involved in the development and use of skill standards?
3. What are the best forms of assessment/testing to use in the skill standards systems?
4. How could a nationwide system of skill standards affect education programs at state and local levels concerning educational program improvement, curriculum modernization, and educational choice?
5. What testing guidelines should be recognized to insure against discrimination based on gender, ethnicity or disability status?
6. To what extent do the current apprenticeship and cooperative education systems in the U.S. provide a framework for setting skill standards?

RECOMMENDATIONS

The Ideal Approach

The suggestions that follow are rooted in assumptions about an "ideal" client-centered skill standards system where individuals and employers are considered the client. The specific assumptions are the system would:

1. Not be bound by individual student/workers age and would be widely accessible to young people and adults;
2. Not be bound by type of institutions providing education or training and flexible in response to changing, and sometimes different, needs of individuals and localities through a variety of forms (e.g., education, full-time and part-time training);

3. Would be able to meet the needs of individuals regardless of type of education and training they are pursuing (e.g. initial preparation, continual, upgrading, or remedial);
4. Would allow career paths within and between industries;
5. Be explicit so that firms, education, training providers, and individuals know what the standards are and where information about them can be obtained;
6. Be a competency-based system;
7. Have a formal assessment and certification of an individual's skills documented by a third party;
8. Be a progressive system so that people can build upon blocks of competencies and adapt to technological and market changes, to improve their prospects or to explore their potential; and,
9. Have a common framework and use common language when describing skill levels across industries and occupations in order for both individuals and employers to easily understand the expectations and value of the use of the standards. The framework should progress from initial (entry) qualifications through several levels to mastery and/or specialization recognition.

These criteria provide the starting point for our responses to the Department of Education's specific questions.

QUESTION 1: WHAT ROLES SHOULD INDUSTRY AND THE FEDERAL GOVERNMENT PLAY IN DEVELOPING A NATIONWIDE SYSTEM OF SKILL STANDARDS?

Industry must be in the recognized lead role for the development of the standards and the federal government must help facilitate such development. It is essential to the success of any skill standards system that the employer community recognizes the value of these measures to their economic success and that they accept them as theirs.

The federal government has the critical function of establishing a consensus building organizational structure. This function cannot be overemphasized. Each of the other countries learned how essential it is to have quasi-independent organization(s) that are charged with the responsibility to bring together the various stakeholders.

The next steps that need to occur to move the development of a voluntary skill standards system forward includes:

▸ **Establish a framework for generating valid and reliable skill standards, assessment and certification systems.**

Common nomenclature and definitions are essential in order to facilitate the expansion and use of voluntary skill standards. There must also be agreement on the best ways to describe and assess performance levels for the complex skills required in the workplace.

▸ **Establish common levels of qualifications.**

The U.S. will need a progressively complex set of levels of knowledge and skills mastery required for individual career entry and progression.

▸ Establish procedures for benchmarking to international standards and for upgrading and maintaining the skill standards continuously.

Skill standards will only lead to higher skills and assist in the improvement of the economic position of firms and individuals if they are benchmarked against the highest international standards.

▸ Establish criteria and recognition procedures for organizations that develop standards.

The criteria should include assurances that any such organization recognized represents all aspects of the industry, that geographic representation exists and membership includes incumbent workers.

▸ Establish criteria and recognition procedures for organizations which design and award the certificates and insure the quality control over the assessment systems.

This recommendation is predicated on two assumptions: (a) a third party assessment process is a component of the skill standards effort, (b) several different organizations can and will be involved in such assessments.

▸ Establish procedures that ensure the security of the individual records of persons that have been awarded recognition of having achieved the qualification(s). Also develop a system that will ensure easy access to the standards themselves.

The report of findings from assessments needs to be generated in a form that is easily recognized and is portable from one place to another across the country. There is also a need to develop and maintain a common locator system for all of the standards.

▸ Establish procedures for disseminating skill standards to employers, education and training providers, assessment systems, and individuals.

Voluntary skill standards have meaning when they are widely used. Considerable attention must be given to promoting use of the standards. Such promotion should be rooted in fact and detail regarding the benefits to individuals, employers and education and training providers.

▸ Develop a shared development and maintenance funding strategy.

The development of comprehensive and nationally applicable skill standards will require support from both the pubic and private sectors. This support can take many forms but without it nationwide skill standards will not exist.

QUESTION 2: WHAT ARRANGEMENTS MUST THE FEDERAL GOVERNMENT ADOPT TO ENCOURAGE INDUSTRY TO BECOME INVOLVED IN THE DEVELOPMENT AND USE OF SKILL STANDARDS?

Note: For purposes of this discussion the term industry is meant to include employee organizations as well as employers.

Millions of volunteer hours are donated each year in the development of validated skill standards. We see that from both the education and industry driven skill standards programs across the country. It is hard to imagine that it will be difficult to garner industry involvement in the development of the standards.

Financial support will be needed to encourage the development of comprehensive skill standards that will assist the novice as well as the specialist/master. Ensuring a comprehensive system, is we believe, one of the key reasons for government action.

- **Demonstrate the value of skill standards to encourage use by employers.**

It is to the second part of the question that our study suggests substantial attention is required. Use within industry may prove to be problematic. There needs to be an aggressive "show them and help them" strategy to encourage industry to use the skill standards systems.

- **Develop support materials to focus use of skill standards in the workplace.**

In addition to "show them" strategies a great deal of "help them" work has to be considered with a strong focus on the front line supervisors and managers.

- **Provide leadership and support to help employers comply with civil rights laws.**

A major barrier to implementing standards by employers is the fear of civil rights violations. Substantial support and development of technical and training materials must be provided that will advance the cause of equity, access and quality standards simultaneously.

- **Promote the use of skill standards through incentives.**

Additional incentives for future consideration include the shifting of the treatment of training in the tax code from one of a current expense to an investment or promoting the creation of grant/levy incentive plan based on a portion of payroll expenses.

QUESTION 3: WHAT ARE THE BEST FORMS OF ASSESSMENT/TESTING TO USE IN SKILL STANDARDS SYSTEMS?

There is no silver-bullet answer to this question. No one form of assessment or testing was identified as being superior either in the literature search or in the in-depth review of selected industry-based skill driven certification programs.

It is important to note the criticality of first performing a valid and extensive job analysis for the creation of standards. Only through a systematically performed job analysis can one insure that the standards and aspects of the certification program accurately represent the needs of the industry and the work of the job incumbent. Secondly, provisions of the Civil Rights Act, the National Labor Relations Act, and other appropriate law associated with assessment and job analysis must be followed.

- **Establish consultation with experts to study and improve assessments processes.**

Materials collected from trade and professional associations for this study could be used to identify organizations using a range of assessment instruments and criteria to award recognition. Based upon such a review, a series of consultations should occur with experienced individuals to help inform decisions about what are the most feasible and appropriate next steps that would help to establish more valid assessment techniques.

▸ **Federal agencies should develop a assessment research strategy that links several efforts together.**

Promotion of a voluntary skill standards systems is a part of the response to the National Education Goals, specifically, Goal 5. The offices and agencies within the federal government that have responsibility for the development and implementation of the various assessment efforts embedded in that goal should coordinate their research and development activities. This must include assessments efforts tied to school-to-work initiatives.

QUESTION 4: HOW COULD A NATIONWIDE SYSTEM OF SKILL STANDARDS AFFECT EDUCATION PROGRAMS AT STATE AND LOCAL LEVELS CONCERNING EDUCATIONAL PROGRAM IMPROVEMENT, CURRICULUM MODERNIZATION, AND EDUCATIONAL CHOICE?

If care is taken to involve all of the stakeholders and if the necessary support systems are developed, the impact on the nationwide system will be profound.

There will need to be a clearly developed consensus regarding the appropriate roles and responsibilities of education and training providers in the development and implementation of a skill standards system.

This study, we believe, highlights the fact that the most important functions to be completed by the education and training institutions are the delivery of education and training services, not the development of the standards themselves. Yet, without strengthening the capacity of the education and training system the skill standards "system" will flounder. There will be a need to develop an array of capacity building networks to assist education and training providers.

▸ **Develop an information dissemination strategy to explain the intent and potential of skill standards.**

At this point in the history of skill standards, one of the tasks is to help people understand what is meant by skill standards and how they can help improve the education and skills preparation of individuals. Several parts of the U.S. Departments of Education and Labor need to be involved and one of the most efficient strategies is to use the network of national associations meetings and publications.

▸ **Develop and assist the implementation of technical assistance to help promulgate the utilization of the standards.**

Consortium-type efforts involving one or more national networks may be a cost-effective approach to develop materials related to the use of the standards. For example, it may be desirable to develop a project that would include representatives of state departments of education, community colleges and vocational technical education to provide technical assistance to their member institutions regarding how to develop articulation agreements between secondary and postsecondary institutions that would incorporate competency based instruction, recognition of work-site learning and independent assessments of student/worker skills and knowledge.

▸ Develop and assist organizations that would have responsibility for being the "linking institutions" between the standard setting and assessment bodies and the education and training provider community.

Focused, sustainable, and jointly "owned" institutions we believe will be necessary. For lack of a better descriptor, we have called these, linking institutions. There are several approaches that could be considered for the development of such institutions. For example, organizations could be established around major occupational clusters or geographic regions. The essential point is that industry representatives, state governments, and most particularly the representatives of secondary and postsecondary institutions must come together and agree upon a common agenda that will continuously translate skill standards into curriculum, update curriculum, instructional materials, and make it widely available to all types of education and training institutions.

▸ Address the issue of staff development within the education and training system.

This issue was consistently identified as a concern. Instructors from all types of institutions need to have a deep understanding of what is happening inside workplaces. Finding qualified instructors will continue to be one of the most important barriers to ensuring quality education and training.

▸ Develop improved program quality assurance mechanisms.

The study highlights how essential it will be to link skill standards effort with any effort to accredit or officially recognize a program of study within any education or training institution.
The federal Department of Education along with the accreditation community and representatives of state government need to be substantially engaged in consultations that focus on how to develop improved quality assurance processes for recognizing programs of quality that will meet the needs of employing community. Additionally, federal and state governments should commit to incorporating skill standards their workforce development programs performance management systems.

QUESTION 5: WHAT TESTING GUIDELINES SHOULD BE RECOGNIZED TO INSURE AGAINST DISCRIMINATION BASED ON GENDER, ETHNICITY OR DISABILITY STATUS?

▸ Build upon the guidelines that have already been established by private, voluntary national standard setting quality assurance organizations.

There are two organizations that have developed strong and well researched testing guidelines for use in standard setting and assessment programs; the American National Standards Institute (ANSI) is the U.S. member body of the International Organization for Standards (ISO) and the National Commission for Certifying Agencies (NCCA). The guidelines vary slightly, probably reflecting the history and traditions of the organizations themselves. Both organizations' guidelines, could be built upon, to assist any testing efforts to ensure against discrimination based on gender, ethnicity or disability status.

QUESTION 6: TO WHAT EXTENT DO THE CURRENT APPRENTICESHIP AND COOPERATIVE EDUCATION SYSTEMS IN THE U.S. PROVIDE A FRAMEWORK FOR SETTING SKILL STANDARDS?

Neither the registered apprenticeship system nor the cooperative education system, in and of themselves represent a framework for setting and implementing skill standards. However, both systems provide lessons for the new system from their implementation history, and both may be regarded as potential points of articulation between systems currently administered by the Departments of Labor and Education and the new skill standards system.

The vocational-technical education system, within which many of the co-op programs are embedded, provides a larger context within which to discuss the development of the framework for setting skill standards.

The Registered Apprenticeship Programs

The federal Bureau of Apprenticeship Training's (BAT) regulations predominately focus on process and program structure issues and the only major "quality assurance" standard contained in those regulations relates to wage rates. The standards expressed in the registration document and included in the individual apprenticeship agreements that serve as contracts for employment are most often time based, not competency based. Attention is focused almost exclusively on the initial preparation of workers, and little attention is given to the continual upgrading of the workforce and very few stress the entire career path. Furthermore, the process standards do not require continual updating and validation of the skill standards, nor do they promote the use of the best practices in assessment. The emphasis placed on assuring quality instruction by many of the national BAT programs appears to be of vital importance in the conduct of a quality apprenticeship program, however, the BAT regulations are silent on the issue of instructor qualifications.

However, individual BAT-recognized apprenticeship programs do provide excellent examples of how to link industry skill requirements to related instruction and then certify individuals based on nationally recognized third party assessments.

Cooperative Education Programs (Co-Op)/ Vocational-Technical Education System (Voc-Tech)

Some cooperative education programs utilize skill standards in their agreements between business, education and student, however, it is not one of the drivers in the standards development process.

The "parent" authorizing legislation for the co-op education programs, particularly for those at the secondary level, has traditionally been through the vocational-technical system. It is important to discuss how this system can support the development of a national skill standards system simply because it will have a broader impact than that of the co-op education program.

It is probably a safe assumption that a substantial burden of implementing the educational components of the occupational preparation for the workforce will fall upon the secondary and postsecondary institutions that is commonly called the voc-ed system. Clearly, the work within the states, to date, to establish skill standards and related competency based curriculum for occupational related education has been accomplished primarily through the voc-ed structure. Also the challenge to improve the articulation between secondary and post-secondary education institutions has been spurred on by the establishment of the Technical-Preparation program within the Perkins II legislation. The effort to increase the integration of academic and vocation education related curriculum is also being stimulated by the Perkins II legislation.

The study documented that the primary use of occupational skill standards has been to develop task lists as the basic units of curriculum, instruction and evaluation criteria for entry to sometimes "journeyman" levels. The study indicates that employers have been willing to work with the state officials on all three of these tasks. However, it also reveals the additional opportunities need to be pursued within the vocational and technical education system:

▸ **Have states collectively examine the current base of occupational skill standards.**

Collective work among all of the states could be undertaken to look across all major occupational areas for which standards have already been developed to ascertain where it would be possible to (a) identify common standards that could be used within a national framework using common language and competencies, and (b) assess where it would be possible to expand the areas of identified occupational competencies (e.g. there were 120 identified for agriculture and 62 for health). While numbers and list do not tell the whole story they are an indicator of level of effort that may not mesh with the highest needs of the labor market.

▸ **Support an R&D effort to identify and measure the competencies that can best be learned within the workplace versus the classroom.**

Attention is needed to sort out which types of competencies are best learned at the work-site, under what conditions, versus what competencies are best learned in a classroom or a laboratory. This research should be linked to testing new forms of evaluations and assessments. A part of the focus should be to determine what will generate a tighter link between the employers and classroom instruction. It should also be linked to testing and developing "portable credentials".

▸ **Improve the pipeline for assuring high quality professional capacity.**

Work among the institutions of higher learning, the vocational education research community, and state policy makers is needed to help the vocational education community to continue to improve and expand competency based curriculum and instructional techniques. Work should also include developing improved student assessment methods that could be incorporated into a commonly recognized portable certificate effort.

▸ **Mesh the use of Skill Standards with the Development of Performance Standards for Vocational Education.**

The Perkins II legislation requirement that states develop performance standards for secondary and postsecondary programs should, overtime, include the use of skill standards.

ADDITIONAL OBSERVATIONS

There are additional observations that were not explicitly required to be addressed in the contract, but emerged in the study that merit consideration by the federal government.

- **Use the common language of standards in classification systems.**

It will be important to pay attention to the issue of using common language across several standard information systems such as the classification of occupations and industries, (i.e.the Dictionary of Occupational Titles, the Standard Occupational Classifications and the Standard Industrial Classification, etc.)

- **Inform the general public and support enhanced counseling services.**

A substantial effort must be made to help individual students and their parents learn about the skill standards and their implications. Individual counselors responsible for helping students in a wide variety of institutions should have a deep understanding of the career and educational options that will be derived from meeting the standards. All career information systems should incorporate information on skill standards and credentials.

CONCLUSIONS

The largest challenge, the team believes, will be the development of the capacity to exploit the standards to their fullest potential within organizations and governments. This will require developing consensus and common action plans among various parts of the federal government as well as within industry networks and sub-national units of governments. This will require concerted and coordinated action on the part of several federal Departments.

The reality is that all of the processes, including the development of a common framework within which the standards are established, within and across industries, will be a politically negotiated process among the various stakeholders and will take several years to develop. This means that the structures and systems that will be established need to be sufficiently flexible so that continuous refinements and improvements will be encouraged.

It is essential that a wide array of capacity building efforts be established that focus on the needs of education and training organizations if the skill standards initiative is to become a part of the human resource development system in the United States. Other countries, including those that have had traditionally strong federal government presence in setting education policy, have found it necessary to develop special support systems for the education and training providers to establish the appropriate linkages with the industries within this arena. The non-directive role that the federal (and arguably the state) government has over education and training institutions in this country makes it even more essential that substantial attention and careful thought be given to developing sustainable institutional arrangements. Agreement will need to be reached among the levels of governments responsible for supporting education and training systems regarding the best approaches to be pursued.

A quiet and deliberate approach that is also aggressive will be required to generate the mutual trust between the private and public sectors, between the potential private sector partners, between the different levels of government, between different types of education and training institutions, between different agencies within the same federal departments and across federal departments. The IEL team came to believe the value of establishing skill standards was worth the challenge.

CHAPTER II

INTRODUCTION AND THE CONTEXT FOR ESTABLISHING SKILL STANDARDS IN THE UNITED STATES

A. BACKGROUND

There is a wide ranging set of historical conditions, some deeply rooted in the American culture, that have influenced the relationship between business and education institutions in setting skill standards.

The following represents a cursory overview of both historical and recent developments influencing the evolution of more formal systems between national organizations representing employers and the various parts of our nation's education system. These factors may appear to be unrelated to one another and indeed we have often treated them as though they are. In combination, however, they represent some of the confluence of forces and factors that must be taken into account when reviewing the landscape in any study of the linkages between business and education developing and using common skill standards.

- Our country's early support for universal compulsory education, including vocational preparation in the early part of this century, reflected the preferences of the society to at least provide a free basic education for our citizens to making their way into the world of work. The high school diploma became the basic passport for continued education and the means of access to the more "attractive" jobs. Unlike other industrialized countries, the U.S. never developed a national system of formal linkages between employers and schools to facilitate the transition of young people from school to work.
- The goal of obtaining at least a high school diploma has long been thought by many to be the most important passport to doing well in the work world and by most measures this has proven to be correct. But, as an ever increasing number of individuals obtain diplomas, the value of the diploma in fact diminishes. Additionally, it has been found to be an inadequate "signaling device" because it has proven to be unreliable in indicating to the employer community whether the holder of the diploma has achieved necessary skills. Also, due to changing workplace requirements, calls are coming from many quarters for different forms of certification of knowledge gained and skills acquired.
- One of the more important developments over the past three decades is the growth of public and private postsecondary institutions with explicit missions to provide specific occupational skill training. Most of these community colleges and technical institutions have developed strong networks with local employers in order to provide initial preparation, upgrade training and, when necessary, provide remedial education services. The Technical Preparation portion of the Perkins II

legislation has had a significant impact on the relationship between these postsecondary institutions and the employers with whom they work. Commonly called Tech Prep, key features of this program include the requirement that planning occurs among secondary and postsecondary institutions and business and industry. The process is focused upon the needs of local areas and the goal is to establish articulation agreements among the "partners." An example of some of the questions that this new Tech Prep approach requires the partners to answer include the following: Are skill and quality standards unique to the local area? Will there be formal agreements forged between the education partners and individual businesses and industries on requirements for entry and advanced levels of work? How will skill standards be measured locally? How will transportability of acquired skills be accomplished?

- Defining the content of education credentials reflects a unique American approach. Unlike other countries where the central government has a strong role in defining education standards for the compulsory school years, in most parts of this country until rather recently, defining the content of the general education credential was left largely in the hands of local boards of education. Currently, however, states are using their authority to establish more common "standards" before the most basic credential (high school diploma) can be issued.

At the postsecondary level this country has turned to the private sector to regulate itself. The quality assurance standards have been developed through a complex network of accrediting organizations that have, in turn, used a voluntary commission to establish the criteria for determining how to award credit and credentials.

- With the acceleration of technological change and international competition, initial preparation, no matter how good, is not enough. Continual preparation is increasingly important. There is no consistent way of documenting or certifying the skills acquired by adults on the job or through education and training programs offered by a variety of public and private providers. Without being able to document knowledge and skills acquired in a common language acceptable to employers and educators, adults have trouble building a portable credential that acts as currency in both the employment and education sectors.
- Because education has been viewed as the great "equalizer," the importance of access to education has shaped much of the federal role in education over the past several decades. While no one would assert that all of the issues regarding equity and access to education are totally resolved in this nation, there has been an increasing recognition that just equal access, alone, is not sufficient for the labor market of tomorrow. There is a growing consensus that legitimate national concerns about the quality of education and training programs supported by the federal government must be addressed. Any discussion of quality leads to a discussion of definitions. Discussing definitions leads to discussing the providers of definitions. These discussions have, in

part, led us to the current endeavors to establish more efficient, effective, and sustainable linkages between industry and a wide array of educational institutions at the secondary and postsecondary levels.

▸More than most other countries the equity concerns have also influenced other federal actions that must be considered in any certification of knowledge gained and skills acquired. The Supreme Court has on several occasions called into question the testing and assessment instruments used by businesses to recruit, hire, and promote employees. Any assessment and testing system used cannot penalize an individual's right to the job based on race, sex or some handicapping conditions.

The settlement patterns of our country, the rich natural resource base that undergirded the building of the economic wealth of the nation, the forms of production processes used to build the industrial base, and the free market economic system have all influenced the linkages between education and the workplace.

▸The traditions of guilds and societies were brought over from the Old World but they have taken on distinctly American characteristics. This has been due, in part, to the continual expansion of the westward movement of the polyglot mixture of immigrants making up the population. The dominant role that guilds and societies played in the Old World's politically powerful city/states never took root here, but an historical analysis will show they have had an influence.

▸During this century the need for occupationally specialized workers was minimized due to the strong influence of the Taylorist model of manufacturing. Following this model work was organized in such a way that the worker could learn the specific tasks within a few days or even hours. Job rotations were not the norm nor was there a concentrated push from unions during collective bargaining negotiations in the manufacturing arena for multi-skilled jobs and the attendant training required for such jobs. There are some obvious exceptions to this generalization such as the machine maintenance and precision tool and die making fields. Skill standards were normally set in these cases through the establishment of apprenticeship programs, workers often being selected for such training based on longevity on the job. These manufacturing practices helped develop a tenet that it was the job of schools to provide the basic education for workers and it was the job of employers to train the workers for the specific job. The effect of this has been that for entry level and line worker positions in most manufacturing and some of the service industries there has not been a strong history of skill standard and competency setting systems.

▸The military, one of the largest employers in the United States, has long been involved in establishing the skills required for each position in their service. Since training must be geared to ensuring adequate attainment of skills, efforts to classify tasks and competencies has been of critical importance. For many years the nature of the training has been very specific, as have been the time constraints on learning the tasks. As the needs changed, the military was among the first to use cross training to prepare individuals for doing more than one task. New technologies were often used first in military applications and then translated into civilian uses.

▸With the advent of new information based technologies and manufacturing processes and more attention to satisfying the specialized needs of customers, the basics requirements of the workplace are being altered. The results are multiple. Of particular note for this study is that job classifications are being collapsed, in some instances dramatically, from over six hundred to three or four in a single work site. Line workers, with more access to information, are expected to solve problems for customers, work in teams, adjust machinery, order supplies, and perform a host of other tasks that had previously been in the domain of indirect (or overhead) workers.

These changes have led many representatives of business and industry to realize the importance of different types of skills, including the "softer skills" of communication, ability to work in teams, and problem solving. Carnevale, Gainer, and Meltzer (1990) coined the phrase the "New Workplace Basics" to capture the effects of the shifts currently underway in a wide range of employment settings in all parts of our society.

▸These new workplace basics have also led to calls for national education reform. These initiatives have taken many forms but one result is a growing recognition that it is neither efficient nor effective to have a chasm between the schools and the workplace. The recently completed work of the SCANS Commission helped to clarify that the new work-place basics must eventually become a part of the learning process for all students. It was not chartered, however, to delve into the needs of specific industries and the workers in them. Nor did the Commission have the responsibility to establish the on-going linkages between industries, education institutions, and workers that would assure the specificity needed to make industry and education based skill standards and competencies more pervasive in the United States. However, all of the work of that Commission recognizes the need for such linkages to exist. So, too, did the 1984 amendments to the primary federal vocational education legislation (Perkins I) recognize the need for improved linkages when states were encouraged to establish technical advisory committees of representatives from business and industry.

The Commission on Work-Based Learning, originally established in 1991 by the Department of Labor, helped to build upon the work of SCANS and the legislative initiative contained in the Perkins II legislation (1990) to support collaboration between industry and education to develop skill standards systems. Developing common skill standards that can be used for various purposes by both education and industry was a core recommendation of this Commission. These mandates force the United States into largely uncharted waters, but provide some guidance in setting our direction.

While there has not been a pervasive practice of using industry to define the skill standards and competencies in this country, there exists a rich body of experiences from which to generate a national voluntary skills standards system.

- ▸The most ingrained standards and certification systems controlled by industry can be found in the professions such as medicine, law, architecture, and accounting. In these professions, the ability to practice is now intertwined with minimum postsecondary education requirements, attendance at a college that has been recognized by a special accreditation organization specifically established to assure industry input (e.g. schools of medicine), passage of tests established by the profession organizations, and in some cases requirements for the individual to take continual professional education courses. Though these systems are sometimes characterized as self-regulatory and voluntary in nature, they are now so intricately linked with State licensure requirements it is difficult not to consider the linkages mandatory and regulated.
- ▸A notable example of industry established skill standards are in the craft areas, particularly the construction trades, where movement of workers between a range of jobs is a necessity. The need for some form of "portable" proof that an individual was sufficiently trained to carry out the multiple tasks helped to bring employers and workers to the same table to develop skill standards systems. These industies have a rich and deep history of establishing skill standards.
- ▸Government regulation, or the threat of the same, has also influenced the action of industry representatives to come together to establish skill standards and develop working relationships with education institutions (often including the creation of special accreditation organizations).
- ▸In the grand American tradition of forming voluntary networks of peers there are thousands of national associations. Some of the 3200 industry based associations have become involved in establishing standards and competencies as a service to their members. Members are often desirous of having some form of personal recognition that distinguishes them from others for a variety of reasons (e.g. to give them a competitive edge, personal satisfaction, opportunity for increased remuneration). Meeting the needs of the members is a core function of industry based associations; however, the relative importance of any one association taking on the time consuming and somewhat costly task of developing and maintaining up to date industry skill standards and competencies is not a decision made lightly by most. Such decisions are often influenced by the maturity, size and type of industry, the size of firms within the industry, the range of commonly recognized occupations within the industry, and the ease of recruiting qualified individuals. Many of these associations efforts have focused the skill standards and certification systems on the needs of the managers, professional, and "highly" technical job classifications.

This very brief overview has been provided to reflect just a few of the major historical and current issues that will affect the evolutionary process that is now being undertaken jointly by the Departments of Labor and Education to promote a voluntary network of industry based skill standards and competencies and certification systems.

This is a "first ever" undertaking; in order to develop a common framework that crosses the boundaries of the public and private sectors and considers multiple variations within both of those sectors, a set of ten organizational topics were developed to organize the materials.

B. MAJOR TOPICS

1. A Description of the Individual Program or Systems - This includes an overview of existing systems, and a description of the functional purposes for their development (e.g., individual certification and curriculum development). The target populations are identified and perquisites for access to the system (e.g., participation in training, work experience) are addressed. Courses of study, levels of certification, and management issues such as administrative authority and financing of the system are covered.
2. The Extent of Coverage by the System(s) - This includes the range of industries and occupations covered by the existing systems, the overlap between industries and occupations, an estimation of the number of workers included, and how the coverage coincides with educational activity and government regulation of the occupation and industry.

For these two topical areas every attempt has been made to be as comprehensive as possible, particularly for those occupations that have not traditionally required a four year college degree. This focus was selected by the federal government due to the continuing and mounting concerns articulated by businesses and industry representatives that a serious erosion of qualified entry level workers is permeating the U.S. labor force.

In order to develop an in-depth understanding regarding how several of these systems (a combination of education driven and industry driven systems) have evolved, additional information is provided that includes the following topics:

3. The Historical Development of the System(s) - This includes the driving forces or incentives; the barriers encountered; and what the time factors were for achieving the current levels of usage and coverage.
4. The Partners' Roles and Responsibilities - Information is provided on the varying roles and reasons for involvement of the key partners, including educational systems and institutions, industry associations and employers, accrediting bodies, labor organizations, general government, apprenticeship programs, and other relevant bodies.
5. The Standard Setting Processes - Information is provided on the different methods used in setting skill standards, who is involved, and the time, resources, and staff capabilities used in the process.
6. The Occupational Analysis Processes - How occupations are classified and the variety of approaches used to determine the specific job requirements for a single occupation or common

grouping of occupations are discussed. The time, resources, and staff required for these processes are included where appropriate and feasible.

7. The Assessment Processes - The procedures, instruments, processes, and types of anticipated outcomes of assessment vary and will be described. Specific information includes the types of testing and selection processes used, the relationships to instruction, the associated costs, methodologies used to assure consistency and integrity, methodologies used to insure against discrimination and other legal considerations, and approaches to maintaining and updating the assessment processes.

8. The Instructional Approaches - Information on four major components of the instructional process are explored: the development of curriculum, the delivery of instruction, the selection and training of instructors, and the sites used for the delivery of instruction.

9. The Processes of Maintaining and Updating Standards, et al - Here the focus is on what internal and external factors affect the maintenance and updating of standards and the time, resources and staff needed.

10. How Information is Shared and Used In Skill Standards Systems - How, what, and with whom information is shared by various partners and external groups is described. Also included is information on how skills standards are used by employers in hiring and promotion practices; by educators/trainers in setting program outcomes and performance standards; in curriculum development and instruction; by government in establishing regulations and licensure policy; and by accrediting organizations.

Two very intelligent men made conflicting observations: Mies Van der Rohe said that "God is in the details." Machiavelli is credited with having said that the devil is in the details. What follows are the details.

CHAPTER III

JOB ANALYSIS

A. BACKGROUND

Jobs are critical because they are the building blocks of work organizations. They define roles; enable expectations, judgements, and evaluations; direct activities; form the basis of the reward system; and, through their fulfillment, result in the production of goods and services. Job analysis -- the process of studying and coming to understand the various elements of a job -- therefore, is critical to productivity in the United States. Moreover, job analysis is fundamental to an investigation of industry standards because it provides the "reality check," not only on what workers do as work, but also on the quality of their work performance.

The purpose of this chapter is to investigate the issue and practice of job analysis. Consideration is given to the purposes and legal rationale for performing job analysis. Several alternative techniques for performing job analysis are described, and time factors, resources, and skills necessary for using the techniques are noted. Finally, job analysis as typically practiced in U.S. industry, education, and the military is discussed briefly, particularly in comparison to the formalized systems for performing job analysis.

Job analysis is the systematic and analytic gathering, documenting, and analyzing of information about actions employees take in performing the tasks incumbent to their jobs. That is, analysis deals with information about job content, and job requirements, as well as the context of the entire work organization. Therefore, job analysis is descriptive: it attempts to reduce to words the things that people do in human work, and it is both explanatory and predictive; it is always undertaken to meet a particular purpose or satisfy a specific organizational need.

Among the purposes for which job analysis information has been used are the following:

- Job Description -- Includes identifying information about the purposes of the job as well and a summary of duties, responsibilities, activities, accountabilities and other specifications.
- Job Evaluation and Classification -- Includes the general process of allocating jobs in terms of their worth to an organization and in terms of their importance relative to each other, particularly for purposes of establishing salary pools and administrative hierarchies.
- Job Performance/Performance Appraisal -- Includes the systematic evaluation of employees working at their particular jobs to determine the relative efficiency and effectiveness of individuals. The information is used to make decisions about raises, promotions, and transfers. Also, it provides a formal way to acquire employee feedback.

- ▸Training Design -- Includes identifying the necessary skills, knowledge and attitudes requisite to successful performance in a given job and translating that information into systematic instruction and learning opportunities.
- ▸Work Design -- Includes the arrangement of work activities and tasks, so as to facilitate efficient rendering of services or production of goods.
- ▸Selection and Promotion Systems -- Includes the criteria and procedures used to screen, categorize, rank, promote, qualify, and select people for all jobs/positions within the organization.

Recently, job analysis also has been used to help determine the fairness and legality of employment practices, a use that promises to grow with new legislation and increasing emphasis on the issue of pay and work equity/comparable worth.

Historically, the terms "work analysis," "job analysis," and "occupational analysis" have been used almost interchangeably and have been discussed in management and training literature for most of the 20th century. Taylor, in the early 1900's, referred to work analysis as one of the four great principles of scientific management. Later in the century, work analysis played a major role in the famous and/or infamous time and motion studies of the 1950s and 60s; it was fundamental to job training and performance appraisal systems of the U.S. military and, at least in part, responsible for their reputation as the most highly trained military force in the world. It played a critical role in creating wage and salary standards during the 1970s.

More recently, job analysis has been used to plan and create training programs, to generate testing specifications for licensing and certification, and to formulate legal decisions regarding employment law. Over the next several years, these more recent uses promise to gain even greater attention as the nation addresses industry-wide training standards, broader and more comprehensive testing for licensing and certification, and new and more specific issues of employment-related discrimination.

B. LEGAL ISSUES

Legislation and the courts have had a significant impact on the importance of job analysis since passage of the Civil Rights Act of 1964, as amended. That Act, which requires equality of employment opportunity without discrimination on the basis of race or sex, led to the production of the Uniform Guidelines that promulgate the responsibilities for carrying out the Act and assist employers to comply with the law and regulations.

The most recent of these Uniform Guidelines was created in 1978 and, in conjunction with the 1979 series of Questions and Answers regarding the Guidelines, created the required basis for use of job analysis in selection and promotion procedures. The Uniform Guidelines specifically state that when creating formal selection and promotion procedures, any method of job analysis may be used if it provides information required for the specific validation strategy that is employed.

Sparks (1979 and 1988) has pointed out the necessity of examining terms used within the Uniform Guidelines to understand the types of analysis allowed. Specifically, he argues that the Guidelines define job analysis as a detailed statement of work behaviors and other information relevant to the job. These behaviors involve observable and unobservable components and consist of the performance of one or more tasks. Knowledge, skills, and abilities are applied in the context of work behaviors with the delineation of what the worker does and requires that one utilize some form of observation to make that determination.

Job analysis is critical to employment decisions because it is the foundation upon which employment tests, and inferences based on test scores, are built. Job analysis establishes validity. Three basic types of validity are presented as legitimate in the Guidelines: (a) content; (b) criterion-related; and (c) construct. Content validity is the degree to which some sample of tasks, questions, samples, or items on an assessment accurately represents the defined universe of possible content. Criterion-related validity is the degree to which the scores on a test accurately correspond to the performance, knowledge, and skills of those at work. Construct validity is the degree to which the scores on a test accurately measure a psychological characteristic of interest.

The actual language of the Guidelines outlines three types of validation strategies and indicates how job analysis is important to each. For example, if the strategy is based on content validity, it must be demonstrated that the content of a selection procedure reflects and is representative of important aspects of performance on the job. With content validity, there should be a job analysis which:

> "includes an analysis of the important work behavior(s) required for successful performance and their relative importance and, if the behavior results in work product(s), an analysis of the work product(s). Any job analysis should focus on the work behavior(s) and the tasks associated with them. If work behaviors are not observable, the job analysis should identify and analyze those aspects of the behavior(s) that can be observed and the observed work products. The work behavior(s) selected for measurement should be critical work behavior(s) and/or important work behavior(s) constituting most of the job."

If success in training programs is used in the selection process with content validity, one must establish the close relationship of training content with job performance.

If the strategy is based on criterion-related validity, there must be a statistical relationship between scores on a selection procedure and the job performance of workers. The strategy must be based on a review of information about the job and should include a job analysis. However, certain criteria like production rate, error rate, absenteeism, and length of service may be used without a full job analysis if "the user can show the importance of the criteria to the particular employment context." If performance in training is used as a criterion, then success in training must be properly measured and the relevance of training to work must be demonstrated (a) through comparing training content and work processes or (b) through matching training and work performance measures.

If the strategy is based on construct validity, it must be demonstrated that the selection procedure measures a construct (something believed to be an underlying human trait or characteristic) and that the construct is important for successful job performance. There should be a job analysis for construct validity that shows (a) the work behaviors required for successful performance of the job, (b) the most critical or important work behaviors in the job, and (c) identification of the construct(s) believed to underlie successful performance of these critical or important work behaviors. Then the validity of the relationship of the selection procedure to the construct and of the construct to work behavior must be demonstrated empirically.

In addition to these requirements established by the Uniform Guidelines, case law from the U.S. Supreme Court also has helped establish the need for and importance of job analysis for making employment decisions. Two cases in particular, Griggs v. Duke Power (1971) and Albermarle v. Moody (1975) have helped establish requirements. More specifically, in Griggs v. Duke Power the Supreme Court established the principle of job relatedness, although they did not specifically mention job analysis by name. The court ruled that employment practices that were not job related were prohibited. Specifically, they said that Title VII of the Civil Rights Act of 1964, as amended, requires evidence of validity in a selection procedure if that selection procedure adversely impacts the selection of minority, group employees, or job candidates. In Albermarle v. Moody the court reinforced the importance of job analysis by holding that any validation effort of selection processes that did not include job analysis was insufficient.

After these initial cases established the need for performing and using job analysis information in creating procedures for making employment selection and promotion decisions, more recent court cases have begun to establish procedures that must be followed when performing a job analysis. Thompson and Thompson (1982) and Kuehn, Stallings, and Holland (1990) reviewed dozens of state and federal cases and determined that a number of principles derived from this case law prescribe and proscribe both the practice of job analysis and the practice of testing. The principles that relate to job analysis include the following:

1. "In constructing an examination that will have "content" validity, the preferred course is to have an empirical analysis made of the position for which it is given, usually by experts or professionals in the field. Such an analysis requires a study be made of the job, of the performance by those already occupying it, and of the elements, aspects and characteristics that make for successfully performance." (Chance v. Board of Examiners, 1971).
2. " . . . survey the relative importance of the various skills involved in the job in question and the degree of competency required in regard to each skill. It is conducted by interviewing workers, supervisors, and administrators; consulting training materials; and closely observing actual job performance." (Vulcan Society v. Civil Service Commission, 1973.)
3. "The cornerstone in the construction of a content valid examination is the job analysis. Without such an analyses to single out the critical knowledge, skills, and abilities required by the job, their importance relative to each other, and the level of proficiency demanded to each

attribute, a test constructor is aiming in the dark . . . " (Kirkland v. Department of Correctional Services, 1974).

4. "A task-oriented analysis was not done during the development of the 1975 trooper examination. To the extent that this was not done, the development of the 1975 trooper examination based on a content validity strategy was not in accordance with professional standards or in compliance with federal guidelines on employee selection." (U.S. v. State of New York, 1979)

5. "Job incumbents are job knowledge specialists and should be part of the job analysis." (Gillespie v. The State of Wisconsin, 1985)

6. "Regional or job context variability must be taken into account in test content domain definition. Incumbent sample must be representative." (Burny v. The City of Pawtucket, 1983; Allen v. Isaac, 1986). The Civil Rights Acts of 1964, as amended, the Uniform Guidelines together with their Questions and Answers, and case law rendered by State and Federal Courts establish both the need for performing job/occupational analysis as a basis for constructing procedures for making employment decisions and offer suggestions about how job analyses must be performed in order to ensure that the results of a particular job analysis are valid.

C. JOB ANALYSIS TECHNIQUES

Job Analysis Techniques are the formal procedures that researchers follow in order to obtain and analyze information about the specific jobs. Cornelius (1988) analyzed a number of job analysis studies and determined that the components of the job analysis process fall into four broad categories. Those categories, as presented in Table 3: Components of the Job Analysis Process, are sources of job data; methods of obtaining job data; type of job descriptor; and purpose of the analysis.

TABLE #3

COMPONENTS OF THE JOB ANALYSIS PROCESS*

Sources of Job Data	Methods for Obtaining Job Data
Job incumbents	Observation
Supervisors/managers	Questionnaires
Clients	Work diaries/logs
Training & Evaluation Dept's personnel	Individual interviews
Observers/analysts	Group interviews
Job materials/industry information	Reading/analysis of printed and/or published materials
Training materials	Structured group process
Published information and other data sources	Job expert conferences
	Job performance by analyst

TABLE #3

COMPONENTS OF THE JOB ANALYSIS PROCESS* (cont.)

Type of Job Descriptor	Purpose of Analysis
Tasks and activities performed	Job specifications and prerequisites
Worker oriented processes	Job descriptions
Abilities and aptitudes	Selection systems, testing, licensing, and certification
Skills, knowledge and attitudes	Recruiting strategies
Products, outcomes, and success criteria	Promotion systems
Responsibilities	Wages and salary administration
Physical/psychomotor and psychological demands	Job classification/evaluation
Education and training requirements	Work design/redesign
Contextual components and interaction	Planning, materials development and delivery of training
Decisions and their components	Performance appraisals
	Planning for work force numbers and skills for specific jobs
	Equal opportunity considerations

*Adapted and expanded from, E.T. Cornelius III. "Practical Findings from Job Analysis Research," in The Job Analyses Handbook for Business, Industry and Government, ed. Sidney Gael, 1988.

As indicated in Table 3, a number of purposes can be fulfilled through the use of job analysis information; the particular concerns of this paper are selection and promotion procedures. The Uniform Guidelines and case law have indicated that the most important types of job descriptors available through the job analysis process are tasks, activities, skills, knowledge, and attributes. However, this issue is still open to debate, particularly as it relates to the potential discriminatory practices of assessment processes. More specific information about these types of descriptors will be presented in another chapter of this report, the one dealing on assessment techniques. The two remaining components pointed out by Cornelius, sources of job data and methods of obtaining job data, are the particular concerns of this chapter.

The sources of job data include all the factors that are identified in Table 3 including, for example, job incumbents themselves as well as their supervisors, subordinates, and clients; training department personnel; observers; and job materials, training materials, and additional published information. The methods for obtaining the data include observation, questionnaires, individual and group interviews, and analysis by experts.

Since the 1950's a number of specific job analysis techniques have been devised by researchers as systematic plans for generating useful job analysis information. Among the dozens of techniques that have been created are such notable job analysis procedures as the Critical Incident Technique, the Functional Job Analysis, the Position Analysis Questionnaire, DACUM (Designing A CurriculUM), formal observation, Job Element Analysis, Task Inventory Analysis and its various derivatives, and other similar techniques.

While it is beyond the scope of this project to investigate each of these various techniques for performing job analysis, some brief comparisons seem appropriate.

Functional Job Analysis (FJA)

One of the more notable and widely used techniques for performing job analysis is the Functional Job Analysis (FJA) developed by Sydney Fine as part of the activity to produce the third edition of the *Dictionary of Occupational Titles*. The functional job analysis is a comprehensive approach that investigates the interactions among work, workers, and work organization through a multi-dimensional information collection activity. Major components of the FJA are:

1. Purpose, goals and objectives -- identified by key actors within the organization.
2. Identify and describe tasks -- Articulating specifically what the worker does and what gets done. The tasks are described as actions or action sequences, grouped through time so that they contribute to a specific accomplishment or product. Eventually tasks are written according to a standardized format by the job analyst.
3. Task analysis -- Considering what a worker does according to seven scales: the data scale, the people scale, the things scale, the worker instructions scale, the reasoning scale, the mathematic scale and the language scale.
4. Performance standards -- Defining criteria for evaluating the results of task performance.
5. Training content -- Specifying information on the functional content specific and adaptive requirements of the job.

The FJA information is developed by trained analysts who interview workers and supervisors and who observe work. For example, the job analyst first interviews upper level management to determine organization mission, purpose, goals and objectives so that there is a context into which to place task analysis. Next, the analyst undertakes a series of steps to produce a task bank: a review of existing job information; arrangement of a 1-2 day work session of experts on the job in question (incumbents in the occupation under consideration); welcome subject matter experts; demonstrate how FJA task statements work; list outputs/products/services of jobs; generate tasks; refine task bank; generate performance standards; edit task bank; and administer final task bank inventory.

It has been used extensively throughout industry in managerial, professional, and craft situations. The FJA has been used to classify jobs (within the U.S. Employment Service), to generate work sample tests (for the International Union of Operating Engineers), and to develop performance standards for work (for the Department of Housing and Urban Development). The output also has been used to develop training materials and for job evaluation.

The FJA uses multiple methods to collect useful information. It is relatively simple to use, but requires a job analyst's time and requires specific training for the analyst. The typical FJA might require five days of data collection per occupation, plus preparation and training time; in addition, another several days usually are required to rewrite the task bank and achieve final consensus among subject matter experts. Time is also required to apply the information to the specific purposes for which the FJA was conducted in the first place.

Critical Incident Technique (CIT)

A second frequently used job analysis technique is the Critical Incident Technique (CIT), developed by John Flanders in the early 1950s. The technique involves several basic steps. First, the analyst identifies critical incidents, incidents that illustrate behaviors that are effective or ineffective when accomplishing the aims of the job. Incidents are collected from supervisors, job incumbents and anyone else who may be in a position to evaluate a particular job. There must be agreement among the respondents about the aims or purposes of the job. Information can be collected through individual and group interviews as well as through observations or structured questionnaires.

While an unstructured approach may be used to recall and/or record critical incidents, usually a structured recording format will improve the time efficiency of the session and the quality of the output. In particular, prompting questions such as, "What are the circumstances leading to the example?"; "What was done?" and "What were the consequences of the action?" usually will help the process.

The second step is to classify the critical incidents into categories of behavior. Classification schemes typically are developed by a trained analyst and result in a descriptive format for the different kinds of activities performed at work. Before the incidents can be categorized, the items must be checked for with the job incumbents who provided them (to ensure accuracy), they must be edited to conform with the "rules for well-written incidents," and are usually shortened to about 40 words. Next, the job analyst must sort the incidents into groups or categories. This process can be performed by working with job experts or existing printed materials to devise broad categories before reading the incidents or it can be completed by applying statistical techniques to task ratings. Usually, the categories will be based on the purposes of the CIT analysis.

The final step in the CIT is the retranslation of the incidents. That is, the analyst prepares a survey of incidents for 10-20 raters to judge on a multi-point scale from ineffective to excellent. Thus, ineffective or poorly written incidents can be revised before use.

The Critical Incident Technique has been used to design jobs and develop training curriculum in a variety of occupational settings. These were the purposes for which the CIT was designed. Typically, however, it has been used as a supplemental data collection technique for other purposes such as job selection system design.

The CIT is time consuming, requires someone with special training, and produces data that are not necessarily representative of the entire range of tasks performed in the occupation. The initial data collection takes from several hours to several days, depending on which data collection technique is used; the editing and dimension-defining techniques require several days of an analyst's time; and the retranslation verification requires several days of an analyst's time and a half-day of 10-20 raters.

Position Analysis Questionnaire (PAQ)

A third major type of job analysis technique is the Position Analysis Questionnaire (PAQ) and techniques similar to it. The PAQ was originally developed by Ernest McCormack & Associates at Purdue

University as a strategy to enable job analysts and industrial psychologists to better define, quantify, and compare job characteristics. The PAQ questionnaire uses almost 200 elements of job activity that are organized into six broad categories:

1. Information input or how and where the worker gets information;
2. Mental processes or the reasoning, decision-making, and planning activities that the employee uses;
3. Work output or the activities that a worker performs as well as the tools used in that performance;
4. The relationship with other people, or who else is involved in performing the job;
5. The job context or the physical and social parameters including things like noise and obligations that a job incumbent may encounter; and
6. Other job characteristics which pick up issues like irregular work schedules or repetitive activities.

Items are rated on scales such as amount of time or importance to the job, and analyzed by job analysts who typically complete the questionnaire and group information into categories.

The PAQ allows derivation of job dimension scores for occupations as determined through factor analyses of several thousand jobs. The dimensions provide a kind of "structure" to human work and represent broad behaviors that are required in some fashion or another in most jobs. Each of the six divisions includes its own set of dimensions. For example, the Work Output Division includes the dimensions of using machines, tools, and equipment; general body versus sedentary activity; control and related physical coordination; skilled/technical activity; controlled manual/related activity; use of miscellaneous equipment/devices; handling, manipulating related activity; and physical coordination.

In order to use the PAQ, several operations must be performed. The reliability of PAQ data must be established by computing correlation coefficients between multiple raters and between initial and later rating. In addition, PAQ data must be edited to ensure its completeness and comparability with the requirements of the computerized program that will be used to process it. Moreover, analysts with information about the specific industry and the jobs in question must be trained in the PAQ and the procedures for a PAQ analysis. A PAQ Job Analysis Manual is available to assist with the process. Still, training and support can take a week; and the level of training has a direct bearing on how long the actual analysis will take/cost.

The position analysis questionnaire has been used to create compensation programs and perform job evaluation particularly in finance, health, manufacturing and service industries. Because the PAQ is a combination of contextual information, content, and work requirements, it is sometimes difficult to determine how the items relate to each other or how to use the information to create training programs that are explicitly focused on specific tasks. Nevertheless, it has been used widely and has spawned a number of similar techniques.

Developing A Curriculum (DACUM)

DACUM is a newer job analysis technique, originally devised in Canada and popularized by vocational education in the United States. The DACUM process was refined at the Ohio State University Center on Education and Training for Employment under the direction of Dr.Robert Norton. DACUM charts are used in curriculum development, worker training programs, test development, and needs assessment. The DACUM process involves role incumbents and supervisors in small group interview sessions where they work together to identify job tasks processes and order those tasks and processes temporally.

DACUM sessions usually involve 8-15 workers and supervisors who work for half a day to several days with a trained facilitator to generate the information. First, broad duties are identified. Then, these duties typically are listed on sheets of paper or cards on a board. The facilitator asks the group first to arrange the duties and then to identify the tasks performed by the job occupant for each broad category of activity. These tasks are in turn analyzed for requisite knowledge and skills and then collapsed into main tasks and rated on a scale for frequency and for importance.

The result is a listing of tasks and activities for any particular job, as developed by job incumbents and supervisors that can be used for developing training materials that are highly task specific.

DACUM functions somewhat like an abbreviated version of FJA. It is not especially inexpensive; however, it requires a facilitator and 8-15 job incumbents who miss work. Further, the facilitator must be familiar with the technique and trained in group process management.

According to Dr. Norton, DACUM operates on three basic assumptions:

1. Expert workers can describe and define their job more accurately than anyone else.
2. An effective way to describe a job is to define the tasks expert workers perform.
3. All tasks demand certain knowledge, skills, tools, and attitudes in order to be performed correctly.

Procedurally, DACUM follows a sequential order as follows:

1. Orient the committee
2. Review the occupation
    a. Conduct brainstorming
    b. Review the organization chart
3. Identify general areas of responsibility (duties)
4. Identify specific tasks performed
5. Refine/review task and duty statements
6. Arrange the task and duty statements
7. List requirements:
    a. General knowledge and skill requirements of the job
    b. Desirable worker behavior attitudes and traits
    c. Tools, equipment, supplies, and materials
8. Other desired options

A task must be defined in very specific performance terms. This is often difficult to achieve. Consider the tasks required to solder parts together. The statement, "Understand how to solder," would not be considered a proper task statement since it does not define a specific task. A better statement would be, "Solder resistors to a PC board." Even this statement could be broken down into smaller parts until the statement defines only a single task. The skilled facilitator establishes the degree to which the tasks must be defined. Then, through a process of negotiation, clear, sufficiently detailed performance objectives are established. These objectives must leave no doubt as to the limits of the task. Action verbs used in the descriptions leave no doubt as to the specific task. The tasks define specific jobs under the broader "Competency Area."

According to Norton (1992), a secondary product of DACUM for schools is public relations with business and industry. DACUM often produces long-term results, as indicated in the following reports by schools.

1. Offers of equipment and supplies
2. Offers of teaching personnel in emerging areas
3. Requests for in-service training to meet local needs
4. Increased enrollment in adult upgrading programs
5. Increased support of educational institutions by local business, industry, labor, and management

Job Task Inventory (CODAP and the Extended Search)

Yet another job analysis method is the computer analyzed job-task inventory approach. This approach, often called CODAP, was originally developed by Dr. Raymond Crystal and others for the U.S. Air Force. The CODAP procedure is particularly useful in working with large populations in diverse locations because, as a survey, it allows for collapsing large amounts of data into categories, and manipulating the data statistically to look for relationships and generate descriptive and prescriptive information.

The process involves two basic components. First, a task inventory is developed and used to collect the data about hundreds of tasks from a variety of workers. Data are collected on specific tasks, the time spent on various tasks, tools used, and the general worker attitude toward the job. Next, the data are fed into a interactive computer program to analyze, organize, and report the information from the task inventory. The computer program is called the Comprehensive Occupational Data Analysis Program or CODAP, hence the name. Over 50 standard programs are available for data analysis, covering basic processes such as data preparation and validation, selection of individuals into groups, computation of summary information, comparison of summary information, and prediction.

The most time consuming portion of the CODAP procedure is the initial construction of the task inventory questionnaire. Typically, it is created by job analysts who review all available information on the type of job and who interview and observe workers and supervisors to generate and edit the list. Available information includes library data bases, instructional materials, industry information, and other related task lists. The process of reviewing all such information now is called an "extended search" and sometimes is used as a job analysis technique by itself.

The CODAP survey form usually consists of several types of questions. First, there usually is a general "background information" section on which the respondent indicates data like name, job, educational level, career aspirations, and so forth. Often the background section contains checklist questions that ask respondents to indicate things like tools and equipment used previous to current job, work attitudes, prior training, and so forth. Usually the background information is used to develop groups or categories of respondents for analysis purposes.

The second major portion of the inventory is the task list itself. The inventory usually lists all tasks, grouped under broad duty headings. Each task is stated as an activity, beginning with a performance verb. Incumbent workers fill out the inventory indicating if they perform a task and suggesting the relative amount of time they spend doing each task relative to other tasks. Supervisors provide additional data about tasks, such as the length of the required learning curve before an employee completes the task successfully.

After it is collected, data are processed, analyzed, and reported through use of the available computer programs. The result is job content information such as a description of the work that is performed. Further, the data can be analyzed against the background data of groups of respondents as a way to analyze trends.

A disadvantage of the job-task inventory is that it really does not identify requirements, skills, knowledge, or other characteristics necessary to deal with a particular job except through self-identification by respondents if the items have been included in the background information section.

The Job-Task Inventory Analysis process has been used for a number of purposes including developing job descriptions, classifying and evaluating jobs, and in conjunction with other data, for establishing evaluation systems. However, the most frequent use is to plan and/or adjust training programs so they more accurately reflect the actual practice of work.

Observation

Another technique for performing job analysis is direct observation of work. Observation has a distinct advantage in providing depth of analysis, validity, and flexibility of purpose. However, it is time consuming, difficult to analyze, and susceptible to subjectivity among observers and the quality of their training.

Most often, observation involves some period of structured observation where tasks and activities are noted in pre-designed categories, particularly categories related to non-verbal, spatial, linguistic, and psycho-motor activity. In addition, usually there is a need for periods of unstructured observation where the observer notes and considers context and the interrelated patterns of behavior in the workplace. In both situations, field notes are required that must be transformed into coded data and analyzed to produce some formal written description of the activity in question. Frequently, observation has been used to develop job analysis of occupations where psycho-motor activities hold equal sway with intellectual activities and where contextual situations are particularly important.

Several additional comments are necessary regarding observation as a technique. First, it is almost the only way to get a good representation of the organizational context in which work occurs. Norms, rules, "informal" structure, interaction patterns, and "short cuts" are observable, but available in almost no other way to a job analyst. However, other information such as the relative frequencies of task performance or the importance of various tasks are very difficult to determine through small numbers of observations.

Observation takes time -- time to prepare and arrange, time to observe, and time to transcribe and interpret what was observed. And often the transcription and interpretation process can take twice as long as arranging for and conducting the observation. In general, the time required to conduct observational studies is much greater than studies using interviews or questionnaires, given the same size sample. However, as one of the series of data gathering techniques, it provides very useful information and usually can serve more than one purpose at the same time.

Observation requires trained observers. Usually training will require one or more days during which time the project is discussed; the observation and coding system is explained; practice observations are performed; and feedback regarding observation errors is addressed. Practice must be emphasized as a way to reduce inter-rater differences. Training ceases when the inter-rater error rate becomes negligible and when everyone understands the potential problem areas of "halo effect" loss of detail, contrast errors, and the like. Sometimes technological aids such as audio procedures, videotape, and the like are used in training and in actual observation as a method to overcome potential errors.

One of the most problematic concerns of observation is determining how many observations to make. If observation is used to supplement other information, then many fewer observations are required. Further, in the context of content validity, if one is confident that the observations are representative of the population of possible observations, the number of observations may be few but thorough. However, with construct and criterion-related validity where statistical measures are expected, the number of observations may be more important. For those situations, the technique of activity sampling -- specific numbers of observations for short periods of time -- is useful.

Activity sampling usually involves performing a given number of random, short term observations of job incumbents to note task activity, frequency, and the amount of time spent performing such task. Frequently, activity sampling is used to estimate the proportion of a worker's time spent performing any of the several categories of activity, incumbent to the job. The number of observations required is based on how precise the researcher wants to be regarding worker time use. The more precise the desire the higher the number of required observations. Pape (1988) has developed a somewhat complicated formula for determining how many observations one must make to achieve given levels of confidence and precision.

THE MOST EFFECTIVE APPROACHES

The question then becomes, "Which of the variety of job analysis techniques is most effective?" In spite of the fact that a number of studies have been performed around that question, no clear conclusions can be drawn. Several studies suggest that both simple or complicated analysis methods frequently produce adequate data (Hogan & Fleishman, 1979; Hogan and others, 1980; Jones and others, 1982). Other studies document that supervisors and incumbents agree about the identity of tasks they perform but disagree about the ratings (levels) of the attributes that are required (O'Reilly, 1973; Smith & Lakel, 1979). Still other studies demonstrate that trained observers give fairly similar results concerning job characteristics to job incumbents when both are compared on the same techniques (Jenkins and others, 1975) even though supervisors and subordinates may attach different meanings to the dimension of work. That is, they suggest a different level of importance and frequency to task dimensions and possibly would organize work differently. And yet in another set of studies (Arvey & Begalla, 1975; Cornelius & Lyness, 1980), researchers found that when incumbents and supervisors were used as the source of information, the better educated respondents provided the more accurate data, thus suggesting that even though job tenure and performance level were relatively unimportant in choosing incumbents or respondents, the educational level was important.

In another set of studies, Hermann, Willett and Rayner (1988, 1989) have investigated the types of analysis strategies that work best for producing particular types of job analysis data. Hermann and his colleagues argue that several types of job analysis data are produced during the studies. Not only are task descriptions produced, but the studies generate suggestions of skills and knowledge competency as well as information about the importance and extent of performance for any given task or competency.

When these researchers investigated the Critical Incident Technique, DACUM, the Extended Search of Information (the library search of all published data on the job -- the first step of the CODAP Job Task Inventory) and Observation techniques for providing each of these three types of data, they determined that while each technique produced useful task descriptions, DACUM and the Extended Search/Job Task Inventory were considerably more effective and efficient than were Observation and the Critical Incident Method. More specifically, DACUM and the Extended Search independently generated about 73% of the competencies on a master list of competencies provided through compiling results of all of these techniques. However, when DACUM and the Extended Search were combined, they produced 94% of the total competencies that were identified. Therefore, Hermann and his associates recommend the only truly effective way to conduct job analysis is through using multiple methods to deal with the entire range of tasks and competencies that might be produced in a job analysis.

Three additional points need to be made about job analysis techniques. First, a technique for collecting broad-based information from groups of individuals -- Focus Groups -- has gained recent popularity but probably is not a legally or technically acceptable method for collecting job information. It lacks structure and rigor even though it can be representative.

Second, whatever methods are used, they must involve job incumbents in producing information and must include information that incorporates regional differences from across the United States.

Third, the U.S. Department of Labor, through sponsoring the work of the SCANS commission, has helped focus the attention of many interested parties on the importance of skills and competencies that are part of the job. The SCANS effort, through the testimony and work of academic, government and business officials, developed expressions of the basic skills necessary both for success and for meeting the needs of most "high performance" workplaces. The ideas were refined and extended through conducting over 600 community meetings to discuss the initial findings. Further, the Commission has provided thousands of copies of their work products as technical assistance to local areas and projects that want to move to adopt the SCANS model.

The SCANS model is a type of standards language that provides categories of functional activity that occur, to some extent, in all jobs. The Commission developed a two-part rubric that includes (a) foundation skills (basic sills, thinking skills, and personal qualities) and (b) competencies (resources, interpersonal, information systems, and technology). Figure 1 , SCANS Analysis displays findings of the Commission. Clearly the work advanced the ideas of a job task analysis by emphasizing important and heretofore ignored critical areas of work.

D. JOB ANALYSIS IN PRACTICE

Job analysis in practice comes in a variety of scales, detail, and cost. Further, different institutions within the U.S. economy may approach the process in somewhat different ways. To demonstrate those differences, it is necessary to look only at examples from three different "sectors" of our society -- business, education and the military.

Industry

Within American industry, job analysis has been used extensively to deal with job classification and, in more recent years, has been used to help determine training input. Apprenticeship programs have used task analysis for several hundred years to establish training input and set evaluation criteria for determining individual advancement. However, when the type of job analysis actually performed in American industry is examined it becomes clear that only occasionally is a single system used, either entirely, systematically, or to the exclusion of other techniques. Also, the gathering of job analysis data often has unanticipated positive results. One such instance occurred when the International Union of Operating Engineers used the Functional Job Analyses to collect information to deal with discrimination allegations. In the course of performing the analysis, they developed considerable information that has since been used to create and redesign their extensive training program.

Other occupations also have undertaken systematic analyses of specific occupations within their industries. For example, clerical jobs have been analyzed through job/task inventory analyses applied with the CODAP data processing program. Jobs in finance, banking, sales, and management have been analyzed using the position analysis questionnaire. The job of police officer has been investigated a number of times, usually by employing a combination of the critical incident method and some kind of task analysis inventory.

The combination of techniques seems to be gaining favor, especially because it allows not only for improved validity but also for the data to be put to multiple purposes. In blue collar construction trades, for example, often a task analysis inventory in combination with group interview techniques and formal observation seems to be the preferred methods of collecting information.

Recently, the Laborer's - AGC, the Joint Labor Management arm of the Laborer's International Union of North America and the Associated General Contractors of North America has undertaken occupational analysis of several components of the work that skilled construction laborers historically perform. In that analysis, the laborers used the following combination of methods in order to determine their job tasks and to work from those job tasks to identify skills, knowledge, and attitude competencies. Their activities illustrate the current practice of job analysis in U.S. industries. Among their activities were the following:

- ▸They reviewed all existing, printed material about the jobs, both within their organizations and from other organizations that were associated with the particular craft. For cement finisher, for example, that included reviewing materials produced in Canada regarding the task analysis of the trade, materials produced on new techniques by the World of Concrete as well as specific manufacturers, the skill certification requirements of the American Concrete Institute, and the published training and testing information available in written and computerized forms.
- ▸They convened a nationally representative sample of 150 training directors, supervisors, and tradesmen to work together to review and suggest tasks, and to order tasks according to time, importance, and frequency.
- ▸They interviewed more than 70 tradesmen and supervisors in group meetings to determine specific critical incidents and to prioritize tasks that were important to effective and ineffective work in the trade.
- ▸They prepared a task inventory based on all this information that they sent to a large representative sample of supervisors and tradesmen to have them respond to the validity, importance, and frequency of the task and to ask them to add additional tasks and competencies that might be important.
- ▸They employed trained/experienced observers to frequent the job to verify and clarify the information that was produced.

Based on this information, they are developing a composite description of tasks, skills, competencies, and criteria of performance necessary to operate effectively in that given portion of their craft. The information is being used both to upgrade their training program and to build a series of work sample performance tests to certify the skills of their tradesmen.

FIGURE 1: SCANS ANALYSIS

A THREE-PART FOUNDATION

Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks
- A. *Reading* - locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
- B. *Writing* - communications thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
- C. *Arithmetic/Mathematics* - performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
- D. *Listening* - receives, attends to, interprets, and responds to verbal messages and other cues
- E. *Speaking* - organizes ideas and communicates orally

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons
- A. *Creative Thinking* - generates new ideas
- B. *Decision Making* - specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
- C. *Problem Solving* - recognizes problems and devises and implements plan of action
- D. *Seeing Things in the Mind's Eye* - organizes, and processes symbols, pictures, graphs, objects, and other information
- E. *Knowing How to Learn* - uses efficient learning techniques to acquire and apply new knowledge and skills
- F. *Reasoning* - discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty
- A. *Responsibility* - exerts a high level of effort and perseveres towards goal attainment
- B. *Self-Esteem* - believes in own self-worth and maintains a positive view of self
- C. *Sociability* - demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
- D. *Self Management* - assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
- E. *Integrity/Honesty* - chooses ethical courses of action

FIVE COMPETENCIES

Resources: Identifies, organizes, plans, and allocates resources
- A. *Time* - Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules
- B. *Money* - Uses or prepares budgets, makes forecasts, keep records, and makes adjustments to meet objectives
- C. *Material and Facilities* - Acquires, stores, allocates, and uses materials or space efficiently
- D. *Human Resources* - Assesses skills and distributes work accordingly, evaluates performance and provides feedback

Interpersonal: Works with others
- A. *Participates as Member of a Team* - contributes to group effort
- B. *Teaches Others New Skills*
- C. *Serves Clients/Customers* - works to satisfy customers' expectations
- D. *Exercises Leadership* - communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies
- E. *Negotiates* - works toward agreements involving exchange of resources, resolves divergent interests
- F. *Works with Diversity* - works well with men and women from diverse backgrounds

Information: Acquires and uses information
- A. *Acquires and Evaluates Information*
- B. *Organizes and Maintains Information*
- C. *Interprets and Communicates Information*
- D. *Uses Computers to Process Information*

Systems: Understands complex inter-relationships
- A. *Understands Systems* - knows how social, organizational, and technological systems work and operates effectively with them
- B. *Monitors and Corrects Performance* - distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions
- C. *Improves or Designs Systems* - suggests modifications to existing systems and develops new or alternative systems to improve performance

Technology: Works with a variety of technologies
- A. *Selects Technology* - chooses procedures, tools, or equipment including computers and related technologies
- B. *Applies Technology to Task* - Understands overall intent and proper procedures for setup and operation of equipment
- C. *Maintains and Troubleshoots Equipment* - Prevents, identifies, or solves problems with equipment, including computers and other technologies

Military Services

The military services have been involved in occupational analysis since World War II. Their process has evolved from the review of a simple position description to a systematic analysis approach, involving complex analysis, design, development, implementation and evaluation methods. All branches of the armed services provide an abundance of information related to the development and refinement of occupational analysis processes. Each service, however, has a slightly different process for addressing each area of systematic analysis.

The military job families or clusters are classified into the Military Occupational Specialties (M.O.S.). They examine the total number of positions and tasks related to each arm of the military service. The Navy and Marines identify 262 officer and 474 enlisted categories of jobs. The Air Force identifies 200-300 occupations for enlisted personnel, and the Army identifies 350 enlisted personnel occupations, of which 179 directly correlate with similar civilian jobs. The Air Force indicated that in June, 1991, an "Occupational Conversion Menu" was published to translate job skills from military positions to those of a similar nature in civilian life. Conversion tables were established for the purpose of assisting personnel exiting military service in matching the skills they acquired while in the service to those required in similar civilian jobs. The Army, along with Ohio State University, has developed studies to examine the transfer of Army "alumni" to civilian jobs. Their studies show that 50% of those who left the Army with skill training in a transferable occupation found employment at a higher rate of pay than others, according to John Buckley, U.S. Army.

Although similarities may be found in the systems analysis processes, many distinctions are found in the specific jobs analyzed and the environment in which tasks may be performed. All of the services indicated that they perform 100% surveys of personnel when they are doing occupational analysis of a field. As expected in a closed system, the returns on the survey are quite high. The Air Force notes that they receive around 95% return on their surveys. The other 5% may be unavailable due to combat duty, etc. Other services also indicate a top return on the surveys.

Since the objective of all military services is to at all times have a currently skilled work force, prepared to meet specific standards, each group updates their occupational analysis of functional groups on a regular basis. The Army updates their occupational skills at least every two to three years. Some occupations are updated annually. The Air Force updates their occupations at least every four to five years. Again, occupations which have a rapid technology change or method of work change are evaluated as frequently as needed. The Navy and Marines indicate that they update their fields on a two to three year cycle, except for the new technical fields.

The classification system starts with functional groups which relate to 37 occupational fields. All military services update their occupational analysis of a functional group at least every two to three years. In the new technical fields, the update is performed more often.

During the late 1960s and early 1970s, the Air Force developed an analysis system which addressed a more in depth process of classifying job types.

The current Air Force Occupational Analysis Program (Tartell) includes a closed-loop process which:

1. Establishes an inventory of job skills built through the interview process;
2. Develops a statistically valid survey;
3. Conducts surveys;
4. Scans surveys into a computer system;
5. Analyzes data and interprets for use in a new set of job skills for training;
6. Writes final report for distribution;
7. Utilizes data for training workshops; and
8. Evaluates user impact.

The use of occupational analysis primarily includes four applications:

1. Personnel—merging or separating occupations;
2. Training—what, when, where, to whom, and how to accomplish;
3. Promotion testing—automated test outlines; and
4. Research—contribution to the occupational research data bank.

Six products from the United States Air Force Occupational Analysis System include:

1. Comprehensive task listings;
2. Calculation of the percentage of personnel performing various jobs;
3. Work and task structures for each viable United States Air Force occupation;
4. Training assessment information;
5. Testing; and
6. Task analysis information, including knowledge and skills required.

According to Tartell (1993), the Air Force, along with Dr. Raymond Crystal, through extensive research and development, established the CODAP system in the 1960s and 1970s. In the late 1970s and the early 1980s, the United States Navy, the United States Marines, and the United States Coast Guard, with Dr. Douglas Goodgame, undertook reprogramming CODAP for their usage on IBM equipment. Since that time, those service branches have sponsored many revisions (Woods and Davis, 1993).

This CODAP system allows the three services to use a common core of processes for validation, merging of tasks, adding new requirements, and creating new jobs from the vast array of skills banked in the system. The system allows for skills in job families common across the three services to be processed in the same manner so as to create a common interpretation about tasks required of similar occupations. The Navy uses the CODAP system to aid them in the classification processes, determination of new job requirements, ratings, testing, and promotion of personnel. Although this provides a base of commonality, some processes differ.

All three use a similar occupational analysis system which includes analysis, design, development, implementation, and evaluation.

Analysis includes validating the training requirements through surveys to incumbent workers. These surveys are then processed through CODAP. Through this process, current skills are verified, merged with other skills, combined with those identified as new by incumbent workers, and merged into the classification to design a new list.

The mock list is then presented to subject matter experts to review for the content. A survey is sent to a stratified sample of Marines in the job classification in question for their review. All of this information is optically scanned into the CODAP system. Some of the analysis done by the CODAP system at this time includes determining if several jobs are required to do the same tasks or if a job has had significantly new tasks added. A survey is developed to be sent to another cut of Marines for their verification of the tasks in the classification.

The new task lists are then developed into training standards with steps to be performed, prerequisites identified, terminal learning objectives established, and the support requirements for the training set. Each branch of service has a system of written documents, sometimes referred to as "Orders." These written documents are used to develop curriculum for the training. The Orders identify what will be learned on the job and what will be presented in formal school training. Training may be provided by another command. After the training is implemented, personnel are immediately deployed to the specifically trained job in order to guarantee the maximum level of proficiency in the skills acquired. The evaluation of the training uses the skill standards to determine how well the personnel are performing the tasks on the job.

The United States Navy performs occupational analysis to update the subject matter for their training programs, for testing, for promotional purposes, for ratings of positions, and for creating occupational standards. The Navy updates their occupational skill standards every three years. The process includes using subject matter experts to set the first draft of skills, followed by a panel of experts to review the list. Based on this input, the list is revised and formatted for job incumbents to validate the lists. The job incumbents review the lists to ensure that the "real world" tasks are the primary focus.

The final list is then divided between those skills to be taught on-the-job and those that will require schooling. The standards are used to establish advancement exams and study guides for promotion, norm referenced testing processes, regulation, instructions, and directions on how to process work. The Navy also uses the systemic approach with analysis, design, development, implementation, and evaluation.

The Army is currently examining the possible use of civilian vocational-technical training for personnel. If this is to become reality, occupational skill standards will be the communication device. A critical area will be the testing and certification of these civilian trained military forces.

Education

Job analysis primarily has been used by vocational-technical education to identify the skills students should have mastered upon completion of job training programs.

The practice of using job analysis techniques by education for this purpose had its early beginnings in the 1930s and 1940s as the task analysis methods of industry were utilized in the trades areas. These analysis methods were most frequently used in evaluating jobs for which training programs in secondary education were linked with apprenticeship programs beginning after completion of high school. This practice of job analysis subsided in the 1950s as more emphasis was placed on academic concepts. After World War II, many students attended college under the G.I. Bill, and less emphasis was placed on learning a skilled trade. It was not until the early 1970s that job analysis techniques began to resurface in new formats for use in the schools.

The primary purposes in this period were to:

1. Establish measurable vocational-technical education objectives,
2. Develop curriculum for vocational-technical education, and
3. Design programs which would prepare students to meet the new requirements of business and industry.

In further developing the occupational analysis process in the 1970s, it was determined additional emphasis was needed in the measurement of skill achievement. Prior to this time, educators used conceptual models which focused on the processes of learning in an abstract manner. Dr. Robert Mager is credited with refocusing education in the early 1970s on performance objectives as opposed to learning activities which may or may not lead to learning outcomes. For example, instead of learning math in an abstract word problem, students might learn a geometry lesson by determining the appropriate angle at which to cut a board being used in the construction of a house. This outcome-based approach focused on what was to be attained in measurable terms. When education began to examine outcomes as a basis for structuring curriculum, achievement in the real world became more connected to what was learned in high school. In other words, the needs of business and industry became connected to education outcomes. Evaluation by educators of student performance or mastery of specific skills was finally possilbe.

Job analysis processes were established by state agencies, large local school districts, and multi-state consortiums. This effort was further encouraged by the federal Vocational Education Act of 1964, which set aside funds for program improvement in the areas of research, curriculum development, and professional development. Also, the national curriculum network received funding to establish a dissemination center for each region in the country to assist states in sharing materials and practices. With access to these program improvement funds, states had the opportunity to develop processes which would fit their individual needs in curriculum development and in-service education. As these efforts began, it became apparent that collaboration with business and industry would be necessary to update the foundation of the curriculum to reflect the tasks and skills required at the work site.

Various practices grew through state efforts, especially in the southeastern United States and a few industrialized northern states. These states held a huge investment 'in area vocational schools which were designed to be independent sites dedicated to vocational and technical instruction, primarily for upper-level secondary students and adults.

During this same period of time, several job analysis efforts moved forward. The competency-based movement was supported by the National Center for Vocational-Technical Education at Ohio State University. The center held workshops and provided technical assistance for designing competency-based programs. Competency-based instruction and curriculum was widely accepted in vocational education as a means of establishing measurable objectives.

The national center also began working with the use of DACUM. In part, as a result of the center's work today, at least 38 states use this process or some modified form of DACUM as their method of job analysis.

The Vocational -Technical Education Consortium of States job analysis method (discussed below) is used by over half of the states At least one major curriculum development consortium, Mid-America Vocational Curriculum Consortium (MAVCC), has begun working in a collaborative effort with V-TECS.

Although some states occasionally have used the interview and Position Analysis Questionnaire (PAQ) methods with business and industry projects, few have adopted these methods as their formal job analysis process. This may be due in part to the expense often associated with such intensive methods.

(V-TECS)

In 1973, several southern states formed a network to develop a common process of task development for their states. The network became known as the Vocational-Technical Education Consortium of States (V-TECS).

The consortium has established a systematic development and implementation process for competency-based vocational-technical education which includes:

1. Analysis of jobs and organization of job-related information;
2. Development of components for assessing student achievement; and
3. Design, development, and identification of instructional materials that provide a validated link between instruction and employment.

The V-TECS processes develop the following products:

1. Duty and task lists, including a validated list of tasks performed on the job.
2. Performance objectives for each task including:
   a. Conditions for performance;
   b. The performance expected; and
   c. The standard as an observable measure of performance
3. Performance steps detailing sequential steps to perform a task.
4. Enabling competencies.

5. Related academic skills providing the language arts, mathematics and science skills utilizing the basic essential skills of taxonomy.
6. Criterion-referenced test item banks:
    a. Cognitive items; and,
    b. Performance or psychomotor domain items

The V-TECS system has developed worker-validated tasks and performance objectives which contain job-based standards of performance for more than 170 occupational domains representing more than 700 Dictionary of Occupational Titles.

Thirty-two states have been members of V-TECS at different periods of time. In addition, all branches of the military are associate members, as are the Department of Labor and the Bureau of Prisons.

CHAPTER IV

ASSESSMENT

A. INTRODUCTION AND BACKGROUND

Testing and assessment are virtually a way of life in modern industrial societies. It begins within a few minutes of birth when a doctor strokes her fingernail against the bottom of a newborn's foot to check for reflexes and looks for enzymes from a small piece of fingernail. Individual testing continues in regular checkups, with assessment of height, weight, teeth and eyes. Kindergarten and elementary teachers advance the process by dividing students on teams according to size, strength or speed; by testing the knowledge of spelling words, and by grading student work. In fact, testing and assessment is integral to the American way of education as students are classified and graded according to how well they perform on standardized and teacher made instruments. Life choices are, in part, governed by the scores that one achieves on standardized tests. In many states even earning a high school diploma is contingent upon completion, not simply teacher-made examinations, but also a state level minimum competency tests. All of the testing eventually leads to selection of individuals into occupations, often based on how well individuals achieved with their grade point average or on selection tests. And, yet the examples only represent individual assessment.

In fact, assessment and testing is fundamental to industrial societies. Goods and services routinely are assessed for quality assurance. Programs routinely are evaluated to determine evidence of effectiveness and to generate information on which to make decisions. Products are assessed to ensure safety and to look for "best buys".

Assessment and testing is fundamental to any conception of a national standards program. Standards programs in other industrialized nations include assessment as a necessary step to certify the skills and knowledge of individual trainees. In addition, the information is necessary to determine the effectiveness of the training programs as well as the accuracy and usefulness of the standards program itself. Finally, testing and assessment is a necessary ingredient to permit the match of pools of skilled workers and manpower needs within the larger labor market.

Therefore, the purpose of this chapter is to lay out the issues surrounding assessment as part of a national standards program. The information is presented in three sections in addition to this introduction: legal issues; technical considerations and guidelines for test development; and a brief review of selected practices.

B. LEGAL ISSUES

One must consider legal issues associated with the development of national standards and certification systems for at least three reasons. First, we live in a litigious society. It has become axiomatic that if you have an assessment, testing, and certification program, then someone will sue you. Therefore, one must consider the legal issues to prepare for the inevitable. Second, federal and state legislation, as well as a large body of case law, acknowledge the appropriate oversight, direction, and intervention of law in the development of assessment instruments that are used for making any type of employment decision. Third, consideration of the legal issues surrounding assessment helps to emphasize the necessity of using rigorous methods for developing and using assessment systems to make selection, promotion, termination, certification and licensing decisions within industries.

Four general areas of legislation, together with their case law seem to apply to the issue of assessment. Perhaps the most important law within the assessment arena is the Civil Rights Act of 1964, as amended, together with its Uniform Guidelines on Employee Selection Procedures and the accompanying Questions and Answers on Employee Selection Procedures. This law, the accompanying regulations, and the case law associated with this legislation address the broad issue of the design of tests and assessments. A second area of legislation of concern is a combination of the Fifth (for federal purposes) and Fourteenth (for State purposes) Amendments. These amendments address the issue of the use of information provided through assessments by establishing the right of due process and the expectation that governmental agencies will protect the public by policing practice within occupations. A third area of legislation directly relevant to the issue of assessment is the Americans with Disabilities Act of 1990, which is most concerned with the administration of tests and assessment. The fourth area of legislation associated with assessment is the National Labor Relations Act of through which the employees rights to be involved in creating the specifics of testing is established. Each of these areas of legislation and case law will be explored in the following narrative.

Civil Rights Laws

Title VII of the Civil Rights Act of 1964 is the federal statute that prohibits discrimination in employment. Specifically, it says that it is unlawful for an employer to refuse to hire or discharge an individual, or otherwise discriminate against an individual with respect to compensation and conditions of employment, because of an individual's race, color, religion, sex or national origin. Further, and equally important, the act states that it is illegal or unlawful for an employer to "limit, segregate or classify employees or applicants for employment in any way which would deprive or tend to deprive any individual of employment opportunities or otherwise adversely affect his status as an employee because of such individuals race, color, religion, sex or national origin." Case law associated with this legislation has established two principles through which to view discrimination: disparate treatment and disparate impact. Disparate treatment is intentional discrimination where an individual proves that an employer rejected him because of race, religion, national origin or sex. Disparate impact does not address employer intent, rather disparate impact occurs where neutrally appearing selection criteria or procedures have the effect of discriminating against a protected class. The effect is called adverse impact. It is in light of adverse impact that assessments associated with any national standards and certification must be examined.

The Uniform Guidelines on Employee Selection Procedures and the Questions and Answers were developed by the U.S. Equal Employment Commission to assist employers to create selection procedures that would be legal within the confines of the Civil Rights Act of 1964. The uniform Guidelines define discrimination and adverse impact, prescribe how adverse impact is determined, establish standards for conducting validity studies, and indicate the type of documentation that must be collected and maintained. While the uniform Guidelines and Questions and Answers are not enforceable as law, two previously mentioned Supreme Court cases, Griggs v. Duke Power (1971), and Albermarle Paper Company v. Moody (1975) established the precedents of providing "great deference" to the guidelines and questions. In Griggs v. Duke Power, the Supreme Court struck down employer use of tests because the tests disproportionately excluded black applicants from acquiring new jobs within Duke Power. In Albermarle Paper Company v. Moody, the Supreme Court adopted language from the uniform Guidelines in establishing the standard for employee testing. The Court held that when disproportionate members of a protected class fail to perform adequately on a test, employers must show "by professionally acceptable methods that the results of the test are predictive of or significantly correlated with important elements of work behavior which comprise or are relevant to the job or jobs for which the candidates are being evaluated". In other words, if a test has adverse impact, the test must be valid.

The uniform Guidelines set forth requirements that must be followed in making any type of employment decision. For example, the uniform Guidelines state that they "incorporate a single set of principles which are designed to assist employers, labor organizations, employment agencies and licensing and certification boards to comply with requirements of the federal law prohibiting employment practices which discriminate on the grounds of race, color, religion, sex and national origin. They are designed to provide a framework for determining the proper use of tests and other selection procedures." Moreover, they address any single measure, combination of measures, or procedure that is used as a basis for any employment decision. Further, they claim jurisdiction over the full range of assessment techniques, including paper and pencil tests; performance tests; work sample tests; training programs; probationary periods; physical, educational and work experience requirements; inform or casual interviews; unscarred application forms; performance appraisals; and any other technique used for making such decisions.

Without getting into an elaborate discussion of specific cases, the case law that has evolved through the application of Title VII suggests a series of guidelines that must be applied in developing tests and assessments:

▸An employer's test must be based on a thorough job analysis that establishes the knowledge, skills and abilities necessary to perform successfully the job that is under consideration. (Albermarle Paper Co. v. Moody 1975; United States v. the City of Chicago, 1977; Kirkland v. the New York Department of Correctional Services, 1974).

- Evidence must be produced to demonstrate a link between the job task analysis and the test content to demonstrate test validity. (U. S. vs. the City of Chicago, 1984).
- The content validity of the test must include results from the job analysis that indicate the relative importance of the identified work behaviors. Furthermore, there must be a correlation between the importance of a job function as determined by the job analysis and the weight it is given to this function on the examination. (Easley vs. Anheyser-Busch, Inc., 1983; U.S. v. the City of Chicago, 1978).
- Tests must provide for adequate agreement among raters of behaviors of job applicants. (Thomas v. the City of Evanston, 1985).
- Records of the job analysis and of test results must be accurate and kept on file as future documentation. In addition, the employment decisions that are rendered must be based on the documented evidence produced by the test (Bigby v. the City of Chicago, 1984; Brito v. Zia Company, 1973; Loiseau v. the Department of Human Resources of the State of Oregon, 1983; and Marquez v. the Omaha District Sales Office of the Ford Motor Company, 1971).
- Ratings that are established should be behaviorally based on performance dimensions rather then personality traits. Sample of traits that the courts have ruled against include items such as: attention to detail, interest in the job, temperament, adaptability, general business acumen, leadership ability, personal appearance, cooperation and dependability. (Young v. Edgecomb Steel Company, 1974; Robinson v. Union Carbide Corporation, 1976; James v. Stockholm Valves & Fitting Company, 1977).
- Assessment checkout must adhere to a series of criteria for content validity that must be followed when constructing any type of performance assessment. These criteria include the following: (a) testmakers must have conducted a suitable job analysis; (b) testmakers must have used reasonable competence in constructing the test; (c) the content of the test must be directly related to the content of the job; (d) content of the test must be representative of the content of the job and (e) the test must be used with a scoring system that usefully selects among the applicants who can better perform the job. (Guardians Association of the New York City Police Department v. the Civil Service Commission, 1980 and Vanquard Justice Society v. Hughes, 1984).

Although these findings provide useful direction when constructing assessments, at least two problems remain. First and unfortunately, even if an industry follows these guidelines to develop selection procedures, there is no absolute guarantee that the courts will find the test procedure valid. Kleiman and Faley (1978) analyzed court cases as well as the Guidelines and federal law, concluded that "the courts have not agreed upon a uniform set of standards. In some instances, tests are judged solely on the basis of their face validity; in others, extensive evidence is required. The major factor accounting for these differences appears to be the philosophy and/or sophistication of the judges with respect to the area of personnel testing."

Second, it unclear that the principles of validity absolutely pertain in the absence of adverse impact. The Guidelines indicate that validity is questioned only if adverse impact is found. Nevertheless, it would seem that in the system of national standards, the issue of validity should take precedence regardless of the existence of adverse impact.

Labor Relations Laws

A second legislative area that has implications for the development of assessments is the National Labor Relations Act. The National Labor Relations Act applies in unionized workplaces and specifically requires that the employer and the union bargain over wages, hours and terms and conditions of employment. The Act relates to the development and use of assessment techniques in a standards and certification program because case law has established the right of employees to have a voice in the creation and use of such assessments. For example, in the Rapid Roller Company v. The National Labor Relations Board, the courts held that employees and unions must bargain over procedures used to establish the promotion system. Furthermore, in Phelps, Dodge, Cooper Products Corporation v. The National Labor Relations Board, the courts held that the employer and the union must bargain over procedures used to provide merit raises. In both instances, the law indicates that in the organized sector, labor unions must be included with equal voice in the creation of standards and formal systems including assessment systems through which employment decisions are made.

Disabilities Laws

A third area of legislation with direct implications for assessment within a program of national standards is the American Disabilities Act of 1990 (ADA). Among the provisions of the ADA are several that pertain to agencies that give or use the information generated by assessments and examinations. Title II of the ADA prohibits discrimination in offering benefits, programs or services by state and local governments. Title III of the ADA prohibits discrimination in the offering of public accommodations and services, and specifically states "any person that offers examinations or courses related to applications, licensing, certification, or credentialling for secondary, post secondary education, professional or trade purposes shall offer such examinations or courses in a place and manner accessible to persons with disabilities, or offer alternate accessible arrangements for such individuals." Thus any standards process that involves assessment and certification is prohibited from discriminating on the basis of disability.

ADA guidelines have been developed to cover a number of the responsibilities of certification boards. For example, applications for testing must include language that allows someone with a disability to indicate that they have a specific need for some type of an accommodation during the testing program. Further, while it may be appropriate for the testing agency to ask for documentation of a particular disability to ensure the validity of the request for accommodation, the agency or entity administering the examination is required to bear the cost for any modification or aids provided within the examination.

The documentation of the disability should be provided by a competent professional familiar with the applicants disability, and must be treated as confidential and privileged information. If an agency cannot provide the requested accommodation at its primary location, the agency may work to obtain alternative sights, or may provide an appropriate alternative accommodation.

The test itself must not assess the disability, but rather skills and knowledge appropriate to the job. That is, very often, a written paper and pencil test might have been designed as a timed test even though time on such as task is not related to the job. Therefore, under ADA accommodations, the test will not include a time component. However, a work sample test whose time component accurately reflects the requirements of that job in the field, may include a time component.

Among the type of accommodations that a test giver should consider are at least the following: architectural accessible testing sites; distraction free space; test schedule variation; extended time for the test taker; a scribe to assist in recording answers; sign language interpreters; readers; modification of the test presentation such as braille editions or large print editions; and adaptive equipment. However, the most important characteristic is that the assessment itself must accurately reflect job requirements rather than some criteria more accurately associated with the individual's disability then with the work.

A last area of legislation related to assessment within national standards and certification systems relates to the legal basis for licensing. The whole issue of due process and licensing examinations is important to the consideration of national standards and certification as an area of law for three reasons: First, if government takes a lead in establishing national standards and credentials that limit people's entry into or advancement within certain kinds of occupations, then the entire process may be subject not only to Title VII of the Civil Rights Act claims, but also to "equal protection and due process" claims under the 5th and 14th Amendments. Second, it is important because whereas licensing exams have not been held to the same standard of validity that certification exams have been held, particularly with regard to Title VII of the Civil Rights Act, if a public entity uses the results of a licensing test to select (as opposed to categories) qualified persons for employment, then, in fact, Title VII applies to the situation (U.S. v. South Carolina, 1978). Third, the issue is important to note because the failure of the courts to apply the rigorous validity standards used for employment examinations to state licensing examinations is simply hypocritical. Licensing examinations are a type of prerequisite to professional employment and seem like they should be treated like any other. In a national system of industry standards and certification, the similarity between certification assessment and licensing exams is bound to demonstrate the importance of treating both systems identically.

The law holds that a government may regulate entry into and the practice of some occupations in order to protect the public. Constitutional due process established by the 5th and 14th Amendment, however, requires that the power of the state be exercised only where it is necessary for the health, safety and protection of the general population. The voluntary adoption of skill standards and certification does not constitute a licensing scheme, nor does licensing preclude the adoption of voluntary standards within an occupation. If employers and unions make decisions about the standards and the criteria for certification in making hiring decisions, the issue of due process in licensing does not apply. However, to the degree that any government agency takes a leading role in setting standards that become prerequisites to employment or advancement in some occupations, then the relationship between the licensing, certification and requirements of due process becomes much more important.

To date, the courts have held that "a state can require a high standard of qualification, but any qualification must have a rational connection with the applicant's fitness or capacity to practice [a licensed occupation]" (Schware v. The Board of Bar Examiners, 1957). The question is, does the standard rationally related to a legitimate state purpose and does it consistently apply?

Most courts have upheld licensing standards if the court can think of any rational purpose to support the requirement.

Due process relates to the issue of certification and licensing to ensure that: (a) all applicants are treated identically and (b) that the course and test content reflects standards on which graduation, certification, licensing and other types of formal recognition are based. Just as courts have ruled that students have a property interest in receipt of their high school diplomas, that psychologists have a property interest in receipt of their license, so too, the courts unquestionably will rule that workers, tradesmen, and others whose jobs are included in some sort of standards and certification programs also have a property interest in the certification that results from that program. This means that in a standards and assessment program, trainees are required to receive adequate notice of expectations and an opportunity to be heard through a fair test. Fair testing requires a direct relationship between the curriculum materials, job expectations, and the content of the examinations. This content and criterion referenced validity to testing clearly is one of the situations that must be included in consideration of the legal implications of assessment.

C. TECHNICAL CONSIDERATIONS AND GUIDELINES FOR TEST DEVELOPMENT

The technical standards for test development are contained in *Standards for Educational and Psychological Testing* (1985) (American Psychological Association, the American Educational and Research Association and the National Council on Measurement in Education). Any type of assessment that is used for making employment selection and promotion decisions is covered under these standards. The following 12 guidelines emerge from the standards:

1. Test content and performance criteria must be based on a thorough job analysis that specifies the tasks to be performed and/or the knowledge, skills, abilities and other personal characteristics necessary to do the work. In addition, the ratings of relative frequency and importance of the tasks, knowledge, skills and abilities must be specified within that job analysis. Job analysis is the only means through which to tie the content of the job with the content of training and assessment.
2. One must prepare a specification document in which is set forth all the rules for developing the

assessment. These rules should include, at a minimum, an outline of the content of the examination; the relative weight of different parts of that content for the examination process; the rules for writing test items including not only traditional multiple choice, true or false, oral and essay questions, but also work samples on the job assessment situations; and other types of performance evaluation. Usually the Specification Manual also should include guidelines for validating the items and general directions for administering, scoring and reporting the assessment.

3. Competent persons need to be involved in developing the test items and situations. Persons with direct knowledge of the occupation must be involved in the review and necessary revision of initial assessment items and situations. The review must discuss item and situation format, directions, placement within the overall document, and the most correct answer for the item. Questions also must be reviewed to insure that they do not inadvertently advantage or disadvantage any subgroup population. Lastly, the reviewers should confirm assignment and correspondence of a question or situation to the specifications within the Specification Manual. That is, they need to insure that the question or assessment situation accurately reflects the type of job task that is knowledge or skill that is being assessed. Notes on the entire review process should be kept as part of the overall documentation of assessment development.

4. One must assemble the examination form, from the items and situations created in the assessment pool and based on the directions provided in the Specification Manual. Attention must be given to the placement of items and situations within the assessment. Further, once completed the entire assessment process must be reviewed by content experts to determine that the situations and questions work, that the pattern of responses is correct, and that the overall sequence of information makes sense. Further, the test constructors must devise a set of directions to guide the trainee through the situation or assessment and answer questions that they might have. The set of directions must be standardized across all test takers.

5. One must develop criteria measures to differentiate between those that succeed in the assessment and those that do not succeed in the assessment. While the guidelines do not prescribe the development of criterion measures, they argue that the measures should not be arbitrary (based on intuition) be based on an unrelated standard like in school (where the minimum passing grade is 70%, and is established by fiat for the entire school system), nor be based on quotas (where a set percentage or number of trainees pass and an additional number fail similar to grading on the curve in order to ensure that certain numbers of students remain in all categories of grades).

Instead, one should select criterion measures based on other types of qualities. Among the measures that one might consider are measures of accuracy within tolerance limits; the number of allowable variations or permissible errors; the quantity or rate of production within an assessment situation; the adherence of products and answers to some criteria included in reference documents that insure the criterion references of the examination; the time limit or speed with which certain types of procedures are completed successfully at work and in the assessment situation; the amount of supervision or assistance that might be provided in the assessment situation or in the performance situation; and the quality or degree of excellence in the effort; and the goodness of fit between the work product within the assessment situation and the work product actually involved on the job.

Each of these criterion measures, while not prescribed in the guidelines, more closely approximates what actually occurs at the job than does traditional grading. In fact, the criterion measure should reflect the necessary requirements to be successful at work rather then some standards merely created for the assessment situation.

Often experts are used as a panel of judges to establish the criteria for success within the assessment situation. The guidelines specify that when professional judgement is used, the qualifications of the judges should be documented. Unfortunately, the guidelines do not suggest how to choose judges nor how many is appropriate. Yaeger (1991) has investigated these issues and offers the following suggestions. Specifically, Yaeger suggests that judges should possess an organized knowledge base on the content of the topics under assessment. Further, they should be chosen on their ability to conceptualize successful and unsuccessful candidates within the assessment situation, and to explain what those differences might be. Further, they should be able to accurately judge the difficulty of the problems at hand, and be able to sort and conceptualize those problems into categories.

Yaeger also addresses the issue of how many judges are sufficient to determine the criterion measures. He suggests using a formula that relates the estimated standard error of the mean, the standard deviation and the number of items.

6. One must establish procedures for insuring fairness in the treatment of those being assessed. These procedures should include, at a minimum, information about expectations on the assessment; how the scores on the assessment will be reported and used; the types of questions or situations included in the assessment; practice questions; application information; and other similar types of information. This information must be prepared to share with assessment takers before the testing situation. Many times, this information is available in a testing bulletin or in "practice" test books that can be purchased. This standard also requires an application form that adheres to the rules of the ADA.

7. One must train raters and establish inter-rater reliability. When a work-sample performance examination is included, a performance can be viewed only once. Because judges may differ in the way they view an observation, at least two judges should view any candidate's performance. The judges should make independent observations, and reach a decision about the appropriateness of the performance. In addition, the ratings of the two judges should be compared to insure inter-rater reliability and training should be provided so that any pair of judges would view the performance in the same way.

8. A Test Administration manual should be provided that insures a standard operating procedure for giving the assessment. This manual should include information, at a minimum, on entry and exit during admission, on how to handle irregularities, introduction to the testing situation, scoring information, and the discussion of feedback. Time limits as well as adaptations to meet requirements of ADA should be included in this manual.

9. Directions must be provided on analyzing and reporting the information. This means providing directions on how to score the test or assessment, how to compare the scores against the standard or other scores, and how to report that information, both to the candidate and to the credentialling body. Other provisions of these directions should be instructions on storing the information, on responding, to inquires about text scores, and documentation about the test that is available to this public.

10. One must provide explanations of formal procedures for test analysis and review. Three issues must be addressed in this standard guideline. First, the test developers must provide evidence and directions for continuing analysis of test items and assessment situations. This analysis includes in determining the difficulty level and the discrimination indices for each of the items. In addition, it should address the reading level of the items as well as their adherence to the guidelines for item writing. This requirement holds whether it be a paper and pencil test or any other type of assessment. Best practice should be followed as one develops this type of information and it must be maintained by the agency on whose behalf the test is provided.

The second part of providing procedures for test analysis and review is to analyze the scores and what they mean, by groups of individuals who actually take the test. That is, one must assess, by types of characteristics such as educational level, job, performance ratings, and membership in groups such as minority groups to insure that no adverse impact is being produced by the test. One must be particularly sensitive to demonstrate that the test scores, particularly the high and the low scores, in fact, have a direct, continuing relationship to performance on the job.

The third portion of providing for procedures for test analysis and review is to generate guidelines, suggestions and time tables that the test developers and sponsoring organization should follow in updating and reviewing test items in situations to insure that they remain current. Such guidelines need to address new technology within the industry as well as advances in the testing procedures.

11. One must provide for examination security. The sponsoring organization as well as the test developers must make security arrangements to keep private, the assessment instrument, the scoring, and the individual scores that are generated through taking the test. Confidentiality laws hold in this situation. Clearly any breech of security results in disallowing use of the test for selection purposes. Test scores of individuals need to be maintained for a given period of time as determined by the sponsoring organization. Usually that period of time is at least three years and more likely 5 to 10 years.

12. One must develop and maintain specific information on each type of validity necessary to support the test. The guidelines and standards specifically require developing three types of validity information, depending on the type of testing. The three types of validity, as explained elsewhere in this document, are content validity, criterion-related validity and construct validity. Depending on the type of assessment, information supporting each of these types of validity for that assessment instrument must be developed and maintained in clearly understandable terms by the test sponsoring organization. In addition, other types of validity such as concurrent, predictive and face validity may be maintained but are not sufficient to support either technical or legal challenges to the test.

D. INDUSTRY PRACTICES IN ASSESSMENT

Businesses and industries use many types of procedures as assessments in order to make employment decisions about candidate selection and promotions. Riley and Warech, in considering the validity and fairness of different assessment measures, suggest that there are at least 18 different types of assessments used by American employers. These types of assessments are illustrated in Table 1. As comprehensive as this list is, it ignores two methods frequently used by employers: on-the-job assessment of actual practice which is frequently used in apprenticeship programs; and portfolio assessment or the intentional inspection of work products against some criteria to determine proficiency. Each of these two types of assessment is addressed later in the chapter.

Table #1

Types of Assessments or Tests Used by American Employers*

1. Paper and Pencil Tests
2. Work Samples
3. Assessment Centers
4. Trainability Tests
5. Interviews
6. Peer Evaluations
7. Self-Assessments
8. Bio Data
9. Grades and Educational Achievement
10. Reference Checks
11. Seniority Systems
12. Personality Tests
13. Projective Techniques
14. Individual Assessment by Experts
15. Scored Training and Experience Evaluation
16. Handwriting Analysis
17. Tests of Physical Ability
18. Integrity Tests

***Source**: Richard R. Reilly and Michael A. Warech. (1988). The Validity and Fairness of Alternative Predictors of Occupational Performance. Berkeley: Center for Behavioral Studies at the University of California, 1988.

Historically, employers have relied on the paper and pencil type tests as their primary means of assessment. Dependence on this technique is reasonable given the development in area of the field of psychometrics in which paper and pencil tests predominate. Further, because these are the types of tests that trainees are used to taking in school and the types of tests that people in industry took when they were in school, it is a logical step to continue their use in making employment selection. The Uniform Guidelines and Questions and Answers related to employment selection address specifically the design and development of paper and pencil tests as opposed to other types of measures such as work samples.

Use of paper and pencil tests in employment and training settings has spawned an entire support industry that has been used to assist in developing and administering those tests to make employment decisions. That support industry is available to provide assistance to the development of assessment for certification. It includes for example, a number of companies and organizations whose specific job is to develop tests. For example, the Educational Testing Service, the National Occupational Competency Testing Institute, the American Institute for Research, the Council on Occupational Research and Development, the American College of Testing, all are organizations whose purpose is to design and administer tests useful for selection purposes for employers in training institutions.

When one examines the paper and pencil tests that these organizations have created, one discovers that they have done a good job of conforming to the standards as established by case law and the Uniform Guidelines. Usually, the items are based on a formal job and task analysis that often involves job incumbents identifying specific tasks. Always, the tests are developed around Specifications Manuals that link the items to the tasks, and the tasks to the domains of activity within the occupation. The Manuals also assign relative weighting, by number of items, that are associated with the various tasks. An example of a page from such a Specification Manual recently developed for the National Glass Association is included as Figure 2.

Test writers usually are careful to devise and follow specific guidelines for writing test items and performance situations. These rules are developed from research on "best practice" in item writing and typically are articulated in the Specifications Manual. A sample of the type of item writing directions that might be provided in a Specification Manual is included as Table 4. Notice in the Table that the specific language of items, the length of items, and their relationship to each other are addressed within the rules.

The professional test organizations also are very careful in establishing statistical measures of reliability and making that information available to the industry association or employer who may be paying for the assessment. Often reliability is calculated through one or more accepted practices such as test-retest, or split half coefficient. Unfortunately, too often reliability, and not validity, seems to be the focus of primary professional test developers.

When one examines sample certification test items prepared by professional organizations, one discovers some of the strengths and limitations of paper and pencil tests. For example, one can use Benjamin Bloom's *Taxonomy of Educational Objectives* to divide work tasks into different levels of functional activity, and then analyze test items in terms of the type of content and intellectual activity that they require in order to answer them correctly. Additionally, although Bloom specifies six levels of cognitive function from recall through evaluation and synthesis, many of the paper and pencil tests that are

Figure #2
Example of Final Test Specifications
Senior Automobile Glass Technician*

RUBRIC	DOMAIN	SUBDOMAIN	TASK	% OF EXAM	# OF ITEMS (70 TOTAL)
01	GLASS INSTALLATION			79	55
0101		Standard Replacement		48	34
010101			Inspect Vehicle for Previous Damage	6	4
010102			Project Vehicle	6	4
010103			Verify Parts	6	5
010104			Select Tools and Safety Equipment	6	4
010105			Remove Old Parts	6	4
010106			Clean and Prepare for Installation	6	4
010107			Install New Part	6	5
010108			Clean and Detail Vehicle	6	4
0102		Pattern Making		4	3
010201			Trace Glass	2	1-2
010202			Trace Vehicle Opening	2	1-2
0103		Glass Cutting		6	4
010301			Glass Selection	2	1-2
010302			Glass Cutting	2	1-2
010303			Glass Finishing	2	1-2
0104		Trouble Shooting		5	3-4
010401			Diagnose Glass Breaks	1	0-1
010402			Solve Problems Caused by Rust	1	0-1
010403			Locate & Correct Air and Water Leaks	1	0-1
010404			Diagnose Moveable Glass Operation Problems	1	0-1
010405			Correct Appearance Defects	1	0-1
0105		Operating Mobile Units		4	2-3
010501			Install & Repair Glass & Related Materials In Uncontrolled Weather Conditions	2	1-2
010502			Stock Tools & Parts in the Mobile Unit	2	1-2

***Source**: National Glass Association, McLean, Virginia, 1993.

Table #4
Item Writing Guidelines

1. Word questions clearly and concisely.

2. Avoid negative and double negative wording as well as other types of absolutes. If they must be used bold or capitalize the type.

3. Ensure that questions are capable of standing independent of other questions in the examination.

4. Write stem so that it asks the central question, allowing a candidate to form a tentative answer.

5. Eliminate clues or tricks from the question.

6. Write the stem longer than the options.

7. Use key words in the stem consistently.

8. Avoid unfamiliar, figurative, literary or textbook language.

9. Eliminate words (some, often) that may have different meanings to different persons.

10. Arrange options in a systematic order.

11. Use the option all of the above only sparingly (if used, it should NOT be correct all of the time). Avoid it where possible. If none of the above is used, make it the correct option at least some of the time.

12. Write stem and options in the same style, with the same type of language. Ensure consistency with the structure of the stem (singular versus plural, make versus female).

13. Write options parallel in length, form and content.

14. Make all options plausible; make some very nearly the best answer.

15. Make sure there is only ONE correct option.

16. Write question grammatically correct and at the reading level of the trainee.

17. Include visuals where possible.

18. Eliminate overlapping options.

19. Write stem as a complete sentence.

used for employment seem to concentrate on the more elementary types of intellectual ability. That is, there tends to be an emphasis within paper and pencil tests to test for recall or simple recognition of information, rather then to look for the application of that information or evaluation of skills. The emphasis on recall is understandable given the difficulty of constructing valid paper and pencil tests to deal with issues such as evaluation, synthesis, and application. Nevertheless, it is possible to build items that match job tasks and intellectual function and some of the certification exams do so.

To point out the differences, let's examine test questions from two of the assessments that are currently used for certification purposes: In one instance, questions are from tests prepared by the National Occupational Competency Testing Institute to assess and certify the skills learned by Job Corps program participants; and in the second instance questions are from the Automobile Mechanics Certification Examination tests prepared for the National Institute for Automotive Service Excellence by American College Testing. Examination of a draft of the test for Job Corps participants reveals one of the limitations of paper and pencil tests. While the items conform to some of the "best practices" for item writing for paper and pencil tests, the items test little of the range of functions that a worker must perform on the job and they do not assess those functions in a proportion relative to the amount of time that the worker spends doing the different functions (or using the knowledge) on the job. By taking a sample of test items, one determines that over 80% of the items on the examination measure what, in Bloom's *Taxonomy*, would be considered recall and recognition skills. That is, the test items simply ask the trainee to identify certain types of terms and tools or to recall specific information about materials associated with the trade. Relatively few of the questions ask trainees to manipulate information, to apply information to a trade situation, to exercise judgement, or to solve problems. In fact, the questions that required more than recall tend to be clustered in the mathematics part of the examination. A sample of two of the typical questions from the examination are included as questions 1 and 2 in Figure 3, Sample Assessment Questions.

By contrast, an examination of the test to certify automobile mechanics illustrates a much broader range of intellectual function when one analyzes the test questions against the different functional levels expressed in Bloom's *Taxonomy*. Not only are recall and recognition questions included, but also questions that relate to application of information and diagnosis of information are included. In fact, a sample of questions from that practice exam illustrate many rules of "best practice" for item writing for paper and pencil multiple choice tests, and suggest that only about half of the items deal with recall and recognition. A much larger percentage of items ask the trainee to apply knowledge or skills that they have learned in training to an actual job situation. Other questions ask trainees to apply knowledge either to produce the answer or to diagnose a problem as described in the test question. Two sample questions requiring higher order skills using Bloom's *Taxonomy* are illustrated as Questions 3 and 4 in Figure 3, Sample Assessment Questions.

Figure #3
Sample Assessment Questions

Sample Recall and Recognition Questions

1. Identify the temporary structure of platform used to support workmen and materials during construction.

   A. masonry table saw
   B. scaffold
   C. mortar board
   D. all of the above

2. The vertical holes in a block are called.

   A. partitions
   B. cells
   C. webs
   D. lugs

Sample Questions Requiring Higher Levels of Functional Skills

3. You are doing a ring job on an engine. The cylinders have .015" taper. Which of the following would be the correct procedure?

   A. Bore the engine.
   B. Install expanders behind the new rings.
   C. Knurl the pistons.
   D. None of the above--this is an acceptable taper specification.

4.

EVAPORATOR PRESSURE GAUGE READING PSI	EVAPORATOR TEMPERATURE oF	HIGH PRESSURE GAUGE READING PSI	AMBIENT TEMPERATURE oF
0	-21	72	40
4.5	-10	105	60
11.2	4	113	64
13.4	8	122	68
15.8	12	129	71
18.3	16	134	73
21.0	20	140	76

According to the above chart, if the temperature of the outside air reaching a normal working air conditioner is 71oF, the pressure in the discharge side of the system is:

   A. 129 psi
   B. 15.8 psi
   C. 12 psi
   D. None of the above

In general, paper and pencil tests for certification have distinct advantages and disadvantages. Advantages include allowing sponsors/test developers to provide excellent statistics on reliability, great ease of administration, and comparable practice for scoring. However, often they do not accurately reflect content validity in an occupational setting because they emphasize school learned information, and deal with verbal type of information, and emphasize recall. It is very difficult, although not impossible, to assess skills. And they are expensive to do develop although relatively inexpensive to use.

Historically, some segments of American industry have used other types of assessment techniques to certify individuals. For example, in apprenticeship programs, as registered apprentices learn by working and earning, they demonstrate their skills and eventually achieve journey worker status. Typically, the assessment that occurs in an apprenticeship program involves several activities. First, assessment is linked to standards as expressed in the registration document for the industry and as expressed in the apprenticeship agreement that serves as a contract for training, pay and assessment between the apprentice and the sponsoring agency. A sample copy of standards for the carpentry trade is included as Table 5. One will notice in the Table that work experience standards are expressed in terms of broad occupational areas of concern such as form building, and expressed in terms of specific tasks and activities that an individual must demonstrate such as building and placing straight concrete forms; and irregular concrete forms, and concrete forms for stairways, floors, walls and columns. In addition, the standards prescribe an approximate number of hours that an apprentice must work successfully on the trade practice in order to master the skills.

Assessment occurs on three levels. First, work hours are recorded and reported to the Joint Apprenticeship and Training Committee for each apprentice. Second, the apprentice's ability to do that work is recorded because the apprentice must continue to work successfully on the trade practice to keep his/her job. By maintaining the opportunity to earn a living, the employer provides the screening that insures the standard is being met. Third, in all apprenticeship programs, the apprentice is required to attend related instructional courses. Related instruction typically is offered in the classroom and deals with the supplemental and theoretical information and knowledge of the craft. Typically, in related instruction programs, paper and pencil as well as demonstration tests are required in order for an apprentice to successfully complete that course.

Thus, three types of information usually are reported to the Joint Apprenticeship and Training Committee: (a) information on successful completion of topics from related instruction; (b) numbers of work hours by type of job process; and (c) information about skill levels mastered either during training or exhibited on the job. A typical apprentice on the job evaluation report is included as Table 5. This particular report is used by the International Union of Brick Layers & Allied Craftsmen to track the skills that apprentices learn at work.

The Joint Apprenticeship Committee reviews the progress of an apprentice every six months and, if the progress is satisfactory, advances the apprentice to a new pay grade.

In most apprenticeship programs, the specific skills that are mastered through the work processes are recorded on an apprenticeship training record that indicates the skills that the apprentices mastered and the degree of level of mastery provided. This type of profile is included as Figure 5. This profile for the printing industry illustrates two additional points about assessment in apprenticeship. First, note that an individual's skills typically are rated on some numeric scale that ranges from "no experience" to "skilled". Most often "skilled" means being able to work independently with no supervision. Second, the proficiencies or competencies are expressed within broader tasks as expressed within the apprenticeship standards document. The Figure depicts a small sample of skills related to several tasks that someone in the printing industry must demonstrate: paste up and layout, composition, and reproduction photography. Each of those activities then is broken into specific competencies for which an assessment is recorded.

Although this type of assessment may provide better content validity for the work that one actually must perform, it does not necessarily use "best practice" in terms of the rating scale itself. The descriptors of "skilled" through "no exposure" with the numeric ratings do not accurately describe the levels of proficiency that an apprentice or journey worker may have demonstrated. And the scale/descriptors introduce potential for serious inter-rater reliability problems.

In some trades, several new types of assessment techniques are being used. For example, the International Masonry Institute, the training arm of the International Union of Brick Layers & Allied Craftsmen and their signatory contractors, has developed and is using a portfolio type of assessment to certify the skills of their journeyworkers who achieve specialty certification. For example, the journeyworker who becomes a certified instructor must, as part of the training and assessment effort, demonstrate his or her skills through a series of activities that include presenting: a number of trade drawings produced by apprentices.

Under the tutelage of the instructor; copies of student records, equipment and inventory records, and samples of other administrative procedures required within the system; an extensive video tape demonstrating a number of information presentation and classroom management skills in the classroom and hands-on training areas; a series of original lessons plans and instructional materials that demonstrate best practice for creating such products; and written and oral examinations.

The Laborer's AGC has moved to create a different type of assessment to certify the trade skills and knowledge of its members. They are developing a series of work sample performance tests through which they will certify the skills of the members within critical occupational task areas in a variety of occupations in the jurisdiction of the Laborer's International Union of North America. The work sample tests, which the Laborer's are calling "performance tests," require a laborer to demonstrate the skill in a simulated off-job-site setting that approximates the work situation. For example, an asbestos abatement worker, in order to earn his or her certification, must successfully complete five performance tests in addition to a written knowledge test. One of the performance tests is a test on inspecting and donning respirators. The test was devised following the requirements expressed in the Uniform Guidelines and in the Standards written by the APA. The test deals with perhaps the most critical job skill of the asbestos abatement worker.

Table #5

Carpenter Apprenticeship Standards

1. **CARPENTER**
   860.381-022

Work-Experience Schedule

The following schedule is an example of the type of work experience and training considered necessary to develop a skilled and productive worker in the carpentry trade. Within the limits of basic trade requirements, the schedule is adaptable to local conditions.

		Approximate Hours
a.	Care and use of tools and woodworking machinery	325 - 500
b.	Form building Build and place straight concrete forms, irregular concrete forms, concrete forms for stairways and floors, walls, and columns.	780 - 1,200
c.	Rough framing Floor, wall, roof, stair, scaffolding, etc., on both house and heavy construction. Roof covering.	780 - 1,200
d.	Layout Batterboards, partitions, doors and windows, box-out in concrete walls.	325 - 500
e.	Outside Finishing Application of door and window trim. Fit and sand doors and windows. Application of all exterior finishes and related trim.	520 - 800
f.	Inside Finishing Application of door and window trim. Fit and sand doors and windows. Application of baseboards and moldings. Construction and setting cases, wardrobes, stairwork. Flooring. Application of hardware and fittings to exterior and interior of building, doors, and windows.	975 - 1,500
g.	Welding	325 - 500
h.	Plastics and resilients	195 - 800
i.	Acoustics and drywall	650 - 1,000

1. Ceilings:
   Layout, cutting, assembly, and installation of all materials and component parts.
   - (a) Hangers, channels, furring and backing boards
   - (b) Bars; main tees, cross tees, splines.
   - (c) Stiffeners and braces.
   - (d) Ceiling angles or moldings.
   - (e) Finish ceiling materials.
   - (f) Items of local practices.

2. Walls and Partitions:
   Layout, cutting, assembly, erection, and/or application of all materials and component parts.
   - (a) Floor and ceiling runners.
   - (b) Studs, stiffeners, bracing, fireblocking.

Table #5

Carpenter Apprenticeship Standards (Cont.)

	(c) Resilient and furring channels.	
	(d) Layout, framing enclosing, and trimming of doorframes, window frames, vents, light wells, and other openings.	
	(e) Wall angles and moldings.	
	(f) Studless and laminated installations.	
	(g) Thermal and sound insulation.	
	(h) Installation of backing and finish materials.	
	(i) Fireproofing of columns, beams, and chases.	
	(j) Items of local practices.	
j.	Miscellaneous	260 - 400
	Safety, scaffolding, walkways, shoring, sheds, protection, etc.	
k.	Asbestos abatement and other hazardous material handling and disposal	65 - 100
	Total	5,200 - 8,000

Related Instruction

The National Joint Carpentry Apprenticeship and Training Committee encourages the implementation of performance based training. The following subject matter should be considered:

a. Accident prevention, first aid, safety hazards, State and Federal safety codes and regulations. Safety courses per the Occupational Safety and Health Administration, U.S. Department of Labor.
b. Ethics and history of the trade.
c. Tools and materials of the trade.
d. Review and application of basic mathematics.
e. Elementary blueprint reading and freehand sketching.
f. Foundations: types and layout.
g. Rough framing: types, plumbing, leveling, and alignment.
h. Exterior finishes: kinds and use.
i. Interior finishes: kinds and use.
j. Roof framing all types and combination.
k. Stairbuilding and finishing.
l. Cabinetmaking: on job-site and installation.
m. Reinforced concrete form construction: materials, types, devices, and their use.
n. Heavy timber construction, framing.
o. Welding: gas and arc, vertical, horizontal, and overhead.
p. Acoustics and drywall: types and their use, layout, cutting, welding, and installing.
q. Plastics and resilients: types and their use, layout, cutting, welding, and installing.

Figure #4

Apprenticeship Reporting Record

APPRENTICE ON-THE-JOB EVALUATION REPORT

Apprentice Name ______________________________

Period of Apprenticeship: 1 2 3 4 5 6

The Joint Apprentice Training Committee requests that you evaluate the apprentice when working on your job. The information you provide will assist the Committee in monitoring his/her progress in the apprenticeship program.

CRAFT SKILLS
PROFICIENCY CODE KEY—L-M-S

Level L: Limited Skill Requires instruction or close supervision to do work.
Level M: Moderate Skill Apprentice generally can perform good work with limited supervision. May not meet all demands of speed and accuracy.
Level S: Skilled. Can work independently in accomplishing work assignment. Meets the full demands of speed and accuracy.

CRAFT SKILL	L	M	S	CRAFT SKILL	L	M	S

APPRENTICE PROFILE

Personality Traits	1	2	3	4	Rating
CO-OPERATION-Willingness to work with others in a helpful way; to do teamwork, to carry out assignments of instr.	Contrary, Bothers Others	Uncertain	Helpful	Highly Cooperative	
APPLICATION AND INDUSTRY-Persistency and constancy of effort, manner of meeting and overcoming difficulties, advantageous use of time.	Wastes Time	Easily Discoruaged	Works Independently	Very Energetic	
NEATNESS AND ORDERLINESS-Care apprentice takes of material and surroundings, also personal grooming.	Slovenly, Untidy	Careless	Tidy	Very Neat and Orderly	
RELIABILITY-Punctuality and regularity of attendance; manner of handling responsible matters; honesty; degree to which apprentice finishes what he/she begins.	Not Dependable	Changeable	Fairly Dependable	Highly Dependable	
INITIATIVE-Extent to which apprentice goes ahead without direction and works without supervision.	Requires Constant Urging	Requires Supervision	Does What He is Told	Promoter of New Ideas	
APTITUDE-Ease with which apprentice acquires skill, learns new methods and interprets directions.	Makes Many Mistakes	Makes Some Mistakes	Capable	Exceptional	
WORKMANSHIP-Skill of apprentice; degree of pride in quality of work produced.	Sloppy	Many Mistakes	Good	Exceptionally Neat in Application	

SIGNED ______________________________ DATE __________
Supervisor

Figure #5
Sample of Printing Industry Competency Profile

On The Job Training/Work Experience

Starting/Ending Date		Contract Hours	Job Title	Supervisor's Name	Company Name & Address	Phone #

Introduction to the Printing Industry Completion of the Introduction Area is required before a PIA PrintED Certificate may be issued to a student for the other areas.

RATING SCALE:

4 - Skilled - can work independently with no supervision
3 - Moderately Skilled - can complete job with limited supervision
2 - Limited Skill - requires instruction and close supervision
1 - Exposed to the concept but no hands on experience
0 - No Exposure - no experience or knowledge in this area

Paste-Up/Layout		
1.	Identify basic equipment and hand tools for paste-up.	0 1 2 3 4
2.	Identify basic materials and supplies for paste-up.	0 1 2 3 4
3.	Produce a simple paste-up using the correct procedures, equipment, tools and materials.	0 1 2 3 4
Composition		
1.	Identify basic equipment and hand tools for composition.	0 1 2 3 4
2.	Identify basic materials and supplies for composition.	0 1 2 3 4
3.	Produce headline and body type using the correct procedures.	0 1 2 3 4
Reproduction Photography		
1.	Identify basic darkroom, equipment, and hand tools.	0 1 2 3 4
2.	Identify basic materials and supplies for line photography.	0 1 2 3 4
3.	Produce a good quality line negative using sensitivity guide/scale.	0 1 2 3 4
4.	Identify basic diffusion transfer exposure and processing equipment.	0 1 2 3 4
5.	Identify basic diffusion transfer materials for making line prints.	0 1 2 3 4
6.	Produce good quality line print using diffusion transfer process.	0 1 2 3 4
Stripping (Image Assembly)		
1.	Identify basic stripping equipment and hand tools.	0 1 2 3 4
2.	Identify basic stripping materials and supplies.	0 1 2 3 4
3.	Produce a single color flat with correct dimensions and cut outs.	0 1 2 3 4

BEST COPY AVAILABLE

The test requires the abatement worker to demonstrate and talk his or her way through a number of steps as they perform the test. That is, there is a standard introduction and explanation of expectations for the test. It includes a demonstration of the task together with standard materials that are provided to each individual who is assessed. The individual is given practice opportunity before the assessment actually takes place, and questions and answers are allowed. During the test activity itself, each laborer must perform the entire respirator inspection and donning operation exactly to specification in order to pass, because when one's life is at stake there is no room for error.

The test itself involves 13 steps. Trainees must work through the steps in sequence, must perform the operation correctly, and must make the correct decisions. The operation itself is easily observable by trained instructors who monitor the testing situation and score the exams. The decision-making process of the test is more difficult. To assess decision making, trainees are required to talk their way through this examination. That is, the laborers require the trainee to indicate what step they are undertaking, and then to explain the process that they are using within that step. For example, one step is to examine the head straps or head harness for its integrity. Among the things the trainee has to look for are breaks, loss of elasticity and twists, broken or malfunctioning buckles or attachments, and excessively worn serrations on the head harness that might permit slippage. As the trainee performs that operation, they must explain to the observer what they are doing and seeing in each situation, clearly indicating stretched or damaged areas. The observer must hear the trainee explicitly address each issue and document -- demonstrate whether there is a break a stretch or some other portion of a strap or harness that would render it unusable in the training situation.

The laborers are beginning to generate this type of performance examination for many of the tasks in the trades that they perform. They expect to use performance based assessments both to document the competencies of their workers and as a training device. They recognize that when there are Standard Operating Procedures (SOP's) that must be followed on every job, then creating a performance test that requires one to learn those procedures also can be a very effective training tool. Further, by using the performance assessment as a training tool, they decrease the cost of doing this type of assessment.

Though a number of trades are moving toward work sample types of assessment that might be termed "authentic assessment", one should not assume that paper and pencil tests are unusable, inappropriate or without validity. They are useful, especially in combination with other types of tests. Furthermore, even the "authentic" assessments, particularly the type of performance test described above have difficulties including insuring that each observer will rate a behavior the same way. To that end, the Laborers have designed a training program to teach their instructors to become consistent raters of the performance. Perhaps, an even greater concern is the cost of providing work sample performance assessments. The Laborers believe that it will require establishing "performance assessment days" at their training centers where trainees and working laborers who would like to be certified in that skill can return and take the assessment in order to earn the certification. Assessment skill days are expensive, but provide a good opportunity for training and assessment to the membership.

CHAPTER V
TERMINOLOGY MATTERS

A. INTRODUCTION

During the course of this study it became increasingly obvious that in, this area of emerging public attention and policy development, a great amount of confusion exists simply due to the lack of a common language. Throughout this Volume, as well as Volume II and III, the reader will find the same words or terms often being used interchangeably. This is to be expected. It happens in our everyday lives -- constantly. However, common understandings and common frame of references will be essential as the skill standards initiative moves forward and at some level common understanding of terms will become of major importance.

What follows is a set of observations from the study team and select set of examples from organizations that have already struggled with the issue of terminology and common language. Even from those that have struggled to create a common language that explains, for example, the difference between certification and licensure one finds very different interpretations. Some differences are provided. There is no attempt to suggest what terminology would be preferable -- only to note that it will be important to have a wide array of interests agree to the common language as this exercise moves forward.

B. THE EXAMPLES

1. From the review of the literature on occupational analysis and assessment the following terminology issues surfaced.

- Standards

The definition of the word "standards" is somewhat confusing as reported in the literature. The confusion seems to stem not so much from the basic definition, or fundamental idea of the word, as from the way that the word is used in context. To be explicit, the term "standard", in every sense, seems to answer the question "how good is good enough." However, when one examines the way the term is actually used in the literature, five or six different expressions surface as ways to define what "good enough" means and/or how "good enough" should be examined. For example, sometimes the term means the criteria against which one judges performance, activity and operations, regardless of whether that performance is individual performance, performance of task groups, or performance of entire organizations. When "standards" defines criteria, often it is expressed as profit margin, speed of production, error rate, waste and other similar terms.

Yet criteria is only one of a number of expressions that indicate standards. Other expressions of standards include statements of time, such as in traditional apprenticeship programs where accomplishment of journeyman status necessarily combines mastery of skills and knowledge through required time periods of work experience in various job practices through which the skills are learned.

Time is also implied as the standard to judge the value of almost all of the education that individuals receive. With a few exceptions (discussed in Chapter VI) education credits and credentials are simply not awarded unless time has been measured.

Sometimes the term expresses skills. However, in discussing skills, the conversation may become confused because in some situations the discussion relates to depth of skills and knowledge about a particular occupation or subject, while in other situations, the conversation relates to breadth of skills and knowledges across entire occupational areas. Confounding the issue of skills, sometimes standards are expressed in terms of competencies or measurable characteristics and performances of individual job holders.

Two additional expressions of standards are statements of minimum qualifications and goals. Often when standards are expressed as minimum qualifications, they indicate the entry-level normative expectations for individuals or for organizations that may be looking to achieve some kind of recognition. In these situations, for an individual the standard may be a high school diploma or some other type of certification. For an organization, standards as minimum qualifications and goals may be expressed as quantifiable characteristics such as the elements processes, and programs that institutions of higher education must achieve to earn accreditation through one of the regional accreditation agencies in the United States.

- Certification

The term "certification" in the literature refers to at least two types of activity. In one situation, certification relates to achievement of minimum qualifications for entry into an occupation. Once the person becomes certified, he/she has the right to practice or to work in that occupation. Frequently this type of certification is based on knowledge and may result in a certificate or diploma.

A complementary use of the word certification is as it relates to specialty skills. Here certification typically occurs as one masters additional, specialized, and refined knowledge and skills. The skills might be demonstrated at work or in testing situation in order to earn a certificate, and/or qualify to perform the specialty skills at work.

- Performance Tests

The term "performance tests" expresses two related but somewhat different concepts. In one case, performance test means the type of assessment that Linn and others are calling "authentic" assessment or "situational" assessment. That is, a performance test measures an individual's ability to complete successfully a task within a context like where that task might be performed at work. Performance test in that situation might occur "on the job", at an assessment center, or in a training situation where an individual is given a job task, tools, equipment, and other materials and asked to complete the task to industry established criteria of time and quality.

However, "authentic" or "situational" assessment as a performance test is actually a subset of a second use of the term "performance test." Initially, the task performance tests was used on the Uniform Guidelines of 1978 to mean any type of individual assessment, particularly in a training situation that an employee might undertake either for job selection or for promotion. The term includes paper and pencil tests, work samples, assessment center test performance appraisals, and any other type of test.

▸ Job Analysis

A series of terms are used synonymously to describe this activity: job analysis, work analysis and occupational analysis. Sometimes, however, the term occupational analysis is used to describe a larger effort that includes clustering various jobs or occupations into larger industry groups as categorized through several different techniques.

Another term, "task analysis" is frequently added to the literature. Sometimes authors refer to task analysis as job analysis. At other times authors refer to task analysis as the process of considering job analysis information -- specifically job task information -- in order to elicit specific skills, knowledges, and attitudes that workers must possess and use to perform successfully their job. Other authors elaborate further on that definition by including in the discussion of task analysis, the development of competency statements for the skills, knowledge and attitudes that workers must possess and display.

For this study the following definition was used: Job analysis is the systematic process through which one investigates and articulates the tasks, skills, knowledge, attitudes, context and other characteristics that describe what a worker does in his/her occupation, together with what other workers do and the characteristics of organizational context in which the work occurs.

▸ Skills

The term "skill" basically means the ability to do something, but the connotation surrounding the term can be confusing. The confusion seems to stem from mixing levels of analysis and levels of operation. For example, sometimes the term, "skill" is synonymous with competence suggesting that someone is capable to perform whatever skill or task may be associated with that issue. At the same time, skill can mean virtuosity and thus something significantly more elaborate then simple competence.

A second confusion is how much activity is included in the definition of "skill". Sometimes skill means a very discrete unit of behavior such as driving a nail at a 90 degree angle to the surface into which it's being driven. At other times, skill may mean an entire set of performances such as decision-making where a number of factors -- other skills if you will -- are involved in successful performance of the activity.

Competencies and competency as terms have similar potential confusing elements. Sometimes the distinction is simply made between competent and incompetent and expressed in gross measure. At other times, competency means an entire cluster of skills and knowledge that a worker possesses and uses. Still, a further use of the term is the expression of competence as a single measurable behavior of an individual as it relates to a specific knowledge skill or ability or some combination of necessary knowledge, skills, and ability in order to perform a task. Whichever level of analysis is used, the underlying notion of competency, however, seems to be measurement of successful performance.

2. From the review of trade associations, professional societies and others concerned with credentialling the following selections of direct quotes -- some without attribution -- are provided.

> "Licensing is a mandatory program, usually involving grandfatherism and no real test of competence."

Many of the trade associations do, in fact, have a grandfather clause built into the certification system, at least in the beginning years.

> "There is a distinction between certification and registration. Simply stated, AXXX'S Certification is official recognition by one's colleagues and peers ----it is a specialty certification. It is not a substitute for registration --- Registration is a legal act on the part of states to protect the public --- it is a procedure that requires licensing."

Many of the trade associations, in fact, manage registries as a part of the certification program.

One organization had clearly given a great deal of thought to helping their members understand the different terms and their implications. The name of the organization is not provided.

- Certification

Although a few state and provincial governments refer to the term "certification" as a level of legal recognition for individual practitioners within that state or province, certification is generally defined as a voluntary form of recognition of an individual, granted by an organization or agency which is non-governmental. This organizational certification recognizes that an individual has met predetermined requirements established by the organization. Certification may recognize only minimum competency levels, or may recognize advanced levels of accomplishment or proficiency within a profession.

- Recertification

Some organizations require certificate holders to keep certificates current through periodic re-examination and/or the recording of continuing education units (CEU's). New certificates, or dated stickers affixed to certificates, are issued upon successful completion of each examination. This may be a condition for certificate renewal. In some cases, states or provinces may require periodic re-examination of specialized areas of knowledge, such as codes.

- Advanced Certification

In professions where practice has become specialized, certifying organizations have expanded their scope to issue special certificated for highly developed disciplines. In the interior design profession, this could include, for example, the areas of commercial design, health care, retail or store planning, hospitality, historic preservation, and so forth.

- Certificate Renewal

The annual recording of a certificate, by the certificate holder, to keep the certificate current for legislative and professional purposes is certificate renewal.

- Accreditation

Accreditation applies to programs within institutions, rather than to individuals. Generally, accreditation is a voluntary form of recognition and is granted by an agency or association to programs or organizations that meet established qualifications and education standards, as determined through initial and periodic evaluations.

- Licensing

The specific terminology for licensing (or legal recognition) of a profession varies among jurisdictions. Licensing regulates individuals within a profession, such as interior design. The sole basis for licensing individuals is the protection of the health, safety and welfare of the public. Licenses are granted by a state or provincial government to individuals who have met predetermined qualifications, generally including education and experience requirements, and who have successfully completed an examination for minimum competency within a profession. Licensing may limit the use of a title associated with the profession, as in the case of title act legislation, or, in the case of practice act legislation, may restrict the practice of a profession to those individuals who have become licensed under the legislation.

- Grandfathering

A regulating jurisdiction may, at its discretion, issue licenses to long-term practitioners, or others, who may not meet all license eligibility criteria as set forth in a licensing statute. For example, licensing requires examination, and grandfathering provisions may (but do not always) waive the examination criterion. This general acceptance, often offered only during a specified period of time, is called grandfathering. Practitioners in allied professions may also be grandfathered if the regulatory agency determines that professional and educational backgrounds of the allied practitioners conform to the practice or title criteria.

Yet another example of the use of the term standard can be found from the organization that influences the state licensure community. "Standard setting --- the sound development of an examination form is the determination of a standard, or minimum passing score, used to compare and interpret the test scores. If adequate consideration is not given to how the minimum passing score is determined, the score may not be legally defensible." (Council on Licensure, Enforcement and Regulation (CLEAR).

3. From the review of education's use of terms.

Definitions for occupational skill standards, competencies, and tasks are often interwoven in the terminology used by education for these processes. States belonging to certain consortiums tend to use the definitions developed by that particular consortium. For example, those states using the DACUM process normally use definitions as identified by that process.

One definition, or a derivative of it, used by many groups is that skill standards are work place knowledge, skills, and attitudes required for acceptable job performance. The 26 states belonging to V-TECS more commonly use this definition or a derivative of this definition. Some other examples of definitions include the following:

- Arizona defines a task as .... an observable work place activity involving one or more steps, with a standard of acceptable performance that can be described and assessed. The state defines competency in the following manner: ... an educational "construct" or "concept," an abstraction derived from a work place knowledge, skill, or attitude requirement. Acceptable performance is not always directly observable, and assessment of competence may require demonstration of knowledge in classroom settings. The activities or "competency indicator" to be performed must be defined for developing instruction and assessment of competence.
- Michigan identifies skill standards as job-specific skills which encompass the proficiency to perform tasks and technical functions required in occupations.
- The District of Columbia describes occupational skills as those acquired by observation, study or experience in mental or physical performance basic to mastery of school work or other activities.

Most states do not identify a definition for skill standards, but rather interpret these as synonymous with competencies. Standards are interpreted as the measurement by which competencies are judged to be successfully completed at a prescribed performance level.

Dr. Charles Losh, a well-known occupational curriculum authority, defines task as an observable work place activity involving one or more steps, with a standard of acceptable performance that can be described and assessed. Many states subscribe to this definition of task while others have a slightly modified version. For example, Michigan and Iowa define task as a unit of work with one or more steps and a definite beginning and end. The unit is both measurable and observable.

A key overarching finding of the review of the state's efforts is that no one set of definitions are broadly used throughout all fifty states regarding such terms as: skill, tasks, standard, competency, and the term as well as use of assessments have widely different meanings throughout the states.

The National Governor's Association, recently surveyed state officials regarding the development of industry driven skill standard systems.

State officials surveyed frequently identified the need for clear, commonly agreed upon definitions of key terms as a part of an overall framework to guide the development of national, state and industry initiatives to develop skill standards. The following terms were most frequently used with varying meaning and understanding.

- skills
- foundation skills
- competencies
- skill standards
- tasks
- unit of work
- duty
- core skills
- occupational skills
- occupational clusters

This array of examples are not presented to criticize anyone -- simply to point out that it will be necessary to pay attention to the development of a common language.

CHAPTER VI

THE QUALITY ASSURANCE PARTNERS

A. INTRODUCTION

The next two chapters and the companion Volumes II and III focus on how skill standards are developed and used by both education institutions and industry and occupation based associations. It became obvious that, just as it was necessary to provide a back drop about job analysis and assessment methods, it would also be a value to provide further information on the organizational infrastructure that supports the voluntary system of credentialling in the United States.

America has placed a heavy reliance upon a network of predominately voluntary organizations to promote self-regulation of the education and certification systems. This chapter provides an overview of some of the key umbrella organizations that accredit the accreditors or certify the certifiers, or bestow a seal of approval on testing and assessment instruments. Adherence to the criteria promulgated by any of the following organization's rules and standards are strictly voluntary on the part of an individual institution or organization. However, their influence over the accreditation and certification systems are strong and their experiences and expertise represent a rich foundation that can contribute to the development of a voluntary skill standards system for the country.

It is important to note that no one organization described below "controls the market" in the accreditation, test approval or certification programs. Most of the attention of the organizations that are described below focus on the post high school period of preparation and certification of skills.

B. THE EDUCATION AND ACCREDITATION OVERSEERS

The American Council on Education, composed of 1500 institutions of higher learning and national and regional education associations is an umbrella organization of organizations and focuses on all aspects of post secondary education. It operates through a variety of voluntary Commissions and Centers. It's Commission on Educational Credit and Credentials acts as part of the self-regulation network that guides the operations of the education community in this country. It is the Council's agent on all matters relating to educational credit. The Commission has the task of assuring the integrity of academic credit and credentials. It works to improve credit and credentialing systems, as well as the quality of information that credit and credentials convey for both education and social purposes. It also assists public policy makers in developing and establishing policies that foster adult learning.

The chief functions of the Center for Adult Learning and Educational Credentials, (the operating arm of the Commission) include:

- Assisting institutions and organizations in developing policies and procedures for formally recognizing extrainstitutional learning, integrating this learning into students' program of study, and applying it to credential requirements.
- Operating programs that assess extratinstitutional learning including the a) General Educational Development (GED) Testing Service, b) Credit by Examination Program (CBE), c) Military Evaluations Program, d) Program on Noncollegiate Sponsored Instruction (PONSI), and e) ACE Registries of Credit Recommendations.

An example of one of the programs in PONSI that builds upon the work of Center is to provide college recognition for formal military education and training. Currently the PONSI course assessment process allows trade associations, apprenticeship training programs, individual businesses' training programs as well as the military to have courses approved for college credit. Credit is recommended for vocational certificates through graduate studies. It is at the discretion of individual education institutions to accept this form of credit transfer.

The Credit by Examination program is designed for an individual to skip the requirement of taking selected courses by "testing out." Again, it is at the discretion of individual education institutions to accept the examination in lieu of taking the course.

The Council collaborates with the Council for Adult and Experiential Learning (CAEL), an independent organization, that promotes recognition of prior learning assessment (PLA) gained outside the classroom. In 1991 CAEL conducted a survey of all postsecondary institutions accredited by agencies recognized by the Council on Postsecondary Accreditation (COPA), described below, to assess the status of PLA practices.

For the purpose of the survey PLA was defined broadly to include all modes of assessing learning gained outside the classroom. It included standardized examinations, including Advanced Placement (AP), College Level Placement Examination Program (CLEP), the American College Testing's Proficiency Examination Program (ACT/PEP) and the Defense Activity for Non-Traditional Education Support (DANTES) examination. It also included course challenge or departmental examinations including ACE's Military and PONSI and individualized programs that focus on portfolio-assisted assessments, oral interview and competence demonstrations.

The survey had a 47% response rate (1,732 institutions) and the key finding is that 86% of responding institutions report that they assess prior learning through standardized examinations, course challenge examinations, ACE recommendations, or portfolio assessment. Again, freedom reigns in that each institution can select the type of assessment it will accept and for what purpose. There are other findings of note in the study that need not be described here. What is important for this discussion is that there is a growth of institutions willing to accept some form of documentation of learning gained outside of the classroom if there has been some type of quality assurance like screening of the assessment instruments by some established and respected third party organization (Fugate and Chapman: 1992).

The Council on Postsecondary Accreditation serves as an umbrella standards setting organization for the voluntary act of an education institution to seek either institutional recognition or to have programs offered within the institution to be recognized by a specialized accrediting body. Accreditation is defined by COPA as:

> ".. a communal, self-regulatory process by which nongovernmental voluntary associations recognize educational institutions or programs that have been found to meet or exceed stated criteria of educational quality and assist in the further improvement of the institutions or programs."

How voluntary is voluntary is open to question. Since 1952 the federal government has tied accreditation to eligibility for federal funds for student grant and loan programs. The result is that any educational institution that wants to have a substantial student body will seek accreditation. The Department of Education now has the responsibility to recognize accrediting agencies and it is through this recognition that an individual school is determined to be eligible to obtain federal funds such as federal job training monies and its students determined to be eligible to apply for federal grants and loans.

There are regional and national institutional accrediting bodies recognized by COPA and the U.S. Department of Education. The national bodies accredit particular types of institutions such as the private proprietary schools.

Institutional accreditation is not automatically conferred upon all of the programs within an accredited institution. There are a large number of specialized accrediting organizations recognized by either or both COPA and the U.S. Department of Education. These specialized accreditation organizations focus on specific occupations such as architecture, business administration, construction, journalism and others. Additionally there are several specialized accreditation organizations that are intricately linked to either certification or licensure such as the health and allied health fields, engineering, forestry, landscape architecture, social work, and teacher education. (Lenn: 1987)

Often industry trade associations or organizations focused on professional occupations are key players in the accreditation of education programs, indeed often the initiator for creating an accreditation program. There is some tension within the accreditation community regarding the seeming proliferation of specialized accreditation bodies. The argument follows the line of reasoning that institutional flexibility is hampered and cost are increased when a second tier assessment process necessitated by the specialized accreditation is added onto institutional accreditation. This report was not meant to review in depth the issues of accreditation but it can be expected that, as the skills standard system evolve, there will be a need to address the interrelationships between specialty accreditation and the skill standards system.

This is a period of some turmoil within the accreditation community as it tries to sort out the appropriate role of the accreditation body in the whole arena of measuring institutional effectiveness. The tradition has been that accreditation requirements have focused on the adequacy of facility, faculty, curriculum, and other "input" criteria. Yet the increased call of policy makers to focus on an array of outcome criteria to measure institutional and program effectiveness has helped to fuel a substantial debate regarding the appropriate role of these voluntary promoters of self-assessment to promote quality. Some of the specialized accreditation bodies have adopted the criteria that an institution must have some form of measuring outcome results such as showing how many of their students were able to pass a nationally recognized certification or state licensing exam. It is not so easy for the institutional accreditation bodies to demand such specific proof of results and the search for the correct balance continues.

Public schools are also accredited, often by regional accrediting bodies, however, the states maintain substantial legislative oversight over this process.

C. CERTIFIERS OVERSEERS

The American National Standards Institute (ANSI) was founded in 1918. It is an umbrella organization that does not establish standards; this task is done through 250 qualified technical and professional societies, trade associations and 1,100 individual companies that voluntarily submit them to ANSI for approval. Over 9500 standards have been approved by the organization, mostly for products. It has just recently revised its criteria for approval to assist U.S. organizations be better positioned for international trade as a result of several international trade agreements.

ANSI is the U.S. member body of the International Organization for Standards (ISO.) All of the other countries are represented by the central governments. ISO standards, while voluntary, are increasingly being used to assure conformance of products and services across international boundaries. The ISO 9000 series is a set of technical documents that set forth criteria focused on quality assurances. Embedded in these standards are criteria relating to the quality of the workforce. The standards focus on quality assurances including documentation of processes to determine the kind of skills needed to produce a given product. Companies wanting to participate in the European market are increasingly being required to show proof that workers have the appropriate credentials to perform their jobs.

ANSI's criteria for approving any accreditation program of an individual company, association or institution developing and maintaining certification and accreditation programs includes (but is not limited to) the entities':

- Being operated by a certification body that has acknowledged and/or defensible independent third-party status as a certifier of products, processes, or services;
- Having clear procedural guides that provide details of the parties involved in the program;
- Making "full disclosure" of information concerning the accreditation activity; and,
- Subjecting their program to an annual review by ANSI.

This short list obviously does not capture all of the procedures and quality assurance criteria that ANSI has developed, including the development of a legal contract between ANSI and the certifying organization. Any organization developing standards using the ANSI process must agree to review the standards that have been agreed to by the industry on a regular basis (most of the skill standards must be reviewed at least every five years.) There are several levels of agreements between ANSI and organizations that establish standards, many of which do not warrant the seal of "accreditation" or the highest level of recognition by the organization.

An example of an organization that is using the ANSI processes to develop national voluntary standards is the American Society for Quality Control (ASQC). ASQC has been developing guidelines for using quality assurance principles in education and training programs. The draft guidelines have been developed to be technically equivalent to the relevant ISO standards. For those organizations concerned with the establishment of world class benchmarks for either the instructional process or documentation of skills and knowledge required to prove employees are able to meet international standards the ASQC materials are worthy of review.

A second overseer, the National Commission for Certifying Agencies (NCCA) was created in 1989. It is an organization of organizations established by the National Organization for Competency Assurance (NOCA) as a commission to establish national voluntary standards for and recognize compliance with these standards by agencies certifying individuals in a wide range of professions and occupations. NCCA approval criteria and standards are the only national and voluntary standards for certification agencies, in essence it certifies the certifiers.

This new Commission's predecessor was a similar organization that only focused on the health certification agencies. It was originally supported by the federal government (Dept. of Health and Human Services) to serve as a platform for the development of standards of excellence in private certification.

The parent organization, NOCA, is a membership association whose mission is to provide a forum for all types of practitioners and organizations interested in competency assurance and certification. Members include employers, state licensing boards, educators, federal agencies, test developers, consumer groups, certifying agencies and professional associations.

Underlying the NCCA's effort is the concept of "competence" which, according to NCCA, has yet to become a term that is acceptable to all who use it. For NCCA the emphasis of competence is on results. Competence means: work is to be performed accurately, correct judgments are made and interactions are conducted in a professional manner, it must be demonstrated and maintained throughout ones' practicing life.

The following eligibility requirements must be met before a certification program can even apply for review by NCCA. The program:

1. Shall be non-governmental, unless the certification is for government employees.
2. Must be national in scope.
3. Must be operated by a not-for -profit agency.
4. Shall have completed at least two national examination administrations prior to seeking NCCA approval.

The program must be administratively independent and this means that all policy decisions relating to certification matters are the sole decision of the certifying body and not subject to approval by any other body and that all financial matters related to the operation of the certifying component are segregated from those of the professional association. Other portions of the guidelines require that the certifying body of a professional organization shall be separate from the accrediting body of the professional association.

There must be alternative pathways for individuals seeking certification. This means individuals cannot be required to have attended a specific type of accredited education institution, be required to take the specific courses only offered by a sponsoring organization, nor have had to complete a specified educational degree.

The guidelines require that certifying boards meet a series of psychometric and policy standards such as the Standards for Educational and Psychological Testing and the Uniform Guidelines for Employee Selection Procedures. NCCA, through a joint endeavor with the Council on Licensure Enforcement and Regulation (CLEAR), is in the process of developing an Examining Guide for Credentialing Boards based on the Principles of Fairness to supplement the aforementioned guidelines used by the courts and the federal government.

CLEAR is another actor in the national quality assurance network. It is an affiliate organization of the Council of State Governments and is a voluntary organization of state licensure and testing bodies.

D. REVIEWER OF TESTS

There is an organization that has recently been established to attest to the quality of tests in the public sector. The National Public Service Accreditation Board (NPSAB), established through the auspices of ICMA, a professional association of appointed administrators serving local governments. ICMA responded to the concerns of local government officials regarding the efficacy of a wide range of tests to credential, select and promote public service employees. The current board members of the Accreditation Board consist of representatives of the National League of Cities, the Public Risk Management Association, the National Architectural Registration Boards, and the Fraternal Order of Police, plus an academic expert in the field of educational measurement.

The cornerstone of this Board's effort is to accredit tests and its approval is program specific with the exception of certain general aptitude or selection tests. Different tests for the same occupation may be accredited but accreditation of tests is not automatically transferred between users due to the concern that a specific test may not be appropriate to a specific program.

NPSAB maintains a listing of all accredited tests and sponsoring organizations. Any organization providing tests to a state or local government (such as professional associations, industry associations, municipal leagues, employee unions, private testing firms) may apply for accreditation for each of the tests they provide or the local unit of government may submit the tests they are considering or have developed in-house.

E. THE FEDERAL ROLE

The federal government performs several critical roles in the standard setting/quality assurance systems in the U.S. One of these is publishing the National Institute of Standards and Technology's (NIST) *Standards Activities of Organizations in the United States*. The latest edition was published in 1991, the first in 1941. It includes a wealth of information including some related to credentialing/standard setting bodies.

OMB circular A-119, titled *Federal Participation in the Development and use of Voluntary Standards*, issued in 1982 provides guidance to federal agencies in this area. There is an interagency committee on standards policy established in 1968, however, it appears that most of the federal governments attention has not focused on the issues concerning credentialing programs.

The Federal Trade Commission and the Department of Justice have scrutinized professional credentialing programs. Courts have been most concerned about credentialing when it generates significant economic benefits to those that have the credential and when it denies those without the ability to practice in the profession.

A review of court decisions suggests that the following reasonable criteria be applied in the development of a credentialing program.

- Criteria should be no more stringent than necessary to assure minimum qualifications, especially where credentialing is of significant economic value.
- Criteria must not have the purpose or effect of unreasonably restricting or boycotting competitors.
- Criteria should be established only after reasonable notice and opportunity to participate is afforded to all those who may be affected by credentialing requirements, including potential candidates and users of their services.

In addition, procedures used in the credentialing program have been reviewed by the courts to ascertain if they are objective and impartial. The following guidelines, if adhered to, apparently can withstand legal traps.

- Participation should ordinarily be voluntary and open to those who are not members of the association.
- All candidates should be treated equally; it may not be considered fair to exempt current association members from new credentialing requirements.
- While general promotion of a credentialing program is not a problem, associations should not promote credentialed individuals by name or disparage the noncredentialed.
- Credentialing should not be used to "blackball" or limit the number of competitors arbitrarily.
- Denial of credentials should be made by written notice, giving the reasons for denial; opportunity for an appeal in writing or at a hearing should be offered, to be decided by a body other than the one which made the initial decision.

- Decisions on applications should be made by an objective body not composed exclusively of credentialed individuals who might stand to gain financially from a decision affecting competitors. (LAD,1992).

As can be seen from this cursory review there exists a complex array of voluntary and government entities that are already actively involved in the quality assurance of education and certification systems. It will, no doubt, be necessary to involve these and other organizations in the design and development of the voluntary skill standards network.

RESOURCE LIST FOR ORGANIZATIONS DISCUSSED IN THIS CHAPTER

American Council on Education, The Center for Adult Learning and Educational Credentials, 1 Dupont Circle, NW Washington, DC 20036-1193

American National Standards Institute,
1430 Broadway New York, N.Y.

American Society for Quality Control
310 West Wisconsin Avenue, Milwaukee, Wisconsin 53203

Council on Licensure, Enforcement and Regulation,
3560 Iron Works Pike, P.O. Box 11910, Lexington, Ky. 40578-1910,

Council on Postsecondary Accreditation,
1 Dupont Circle, suite 305, Washington D.C. 20036

National Organization for Competency Assurance,
1101 Connecticut Ave. N.W. Suite 700, Washington D.C. 20036

(NOCA has developed a useful guide, titled *Starting a Certification Program*, that can be ordered at the above address.)

National Public Service Accreditation Board,
Suite 500, 777 N Capitol St., NE, Washington, D.C. 20002-4201

CHAPTER VII

DEVELOPMENT OF OCCUPATIONAL SKILL STANDARDS IN EDUCATION

A. INTRODUCTION

Today's structure of occupational skill standards is a reflection of the past 20 years of change in business and industry. Over time the effects of industrial change pushed forward a process of change in the skills required by industry, and in turn this process brought changes to skill standards setting.

Starting in the seventies, and picking up speed in the eighties a new competency based system emerged. Through the joint efforts of employers and education, this system of competencies, duties, and task lists has become ever more sophisticated in the eighties.

The relationship between education and employers in the development of skill standards started at various points in the states. Four states initiated industry related skill standards prior to 1970. Wisconsin first established occupational skill standards in 1906, with the beginning of their vocational education system. During the 1970s, 11 states moved into business and industry partnerships to develop occupational skill standards and related materials. In the 1980s, 21 states moved into the occupational skill standards system.

The first federal act which addressed the development of skill standards was the Carl D. Perkins Act of 1984. This act required at least two state level technical committees to be established for the purpose of setting skill standards for specific occupational clusters. This enhanced the movement that was already underway.

Many states developed more than the two required committees. Each year, as education found success in establishing skill standards with business and industry, they gained willing partners. Business partners saw the need for equipment, for instructor retraining, and for transition-to-work programs in the form of expanded cooperation in business, and youth apprenticeship. They also saw the need to strengthen the basic financial structure and became the crusaders for the work force program.

Occupational skill standards have been established primarily through the efforts of state levels of vocational-technical education. Although many local education agencies at the secondary and postsecondary levels develop occupational skill lists with business and industry, they are usually developed for a specific community or a small geographic area.

Due to the 1990 reauthorization of the vocational education act, popularly called Perkins II, new opportunities are now available to push forward the utilization of occupational skill standards within the states. This legislation, for the first time, provides fiscal support for national occupational standards to be developed. Developmental work is currently underway to establish a larger pool of national industry-recognized standards. The U.S. Department of Education and the U.S. Department of Labor, in concert with national business and industry trade associations are taking the lead. This effort has just commenced and will continue for one to three years, depending on the availability of funds and the success of individual projects.

States also have the opportunity to develop performance standards for the vocational programs in their states due to the new Perkins II legislation and the chance to improve the articulation process between secondary and postsecondary education institutions through the Technical Preparation programs. As will be seen in the states' responses to the expansion of occupational skills standards, a melding is occuring between these strands, and others.

The existing state systems have been supported by the National Curriculum Network with centers established in each region of the country. The Network's purpose is to disseminate standards, curriculum, and instructional materials for vocational-technical education. Several other curriculum consortiums also have been instrumental in providing curriculum for existing systems. The Mid-America Vocational Curriculum Consortium (MAVCC) is an example of a consortium of states that develops occupational skill standards and curriculum as a joint effort of 14 states.

Several other consortiums of states address specialized areas of the vocational-technical education curriculum, such as entrepreneurship, marketing, and home economics.

Throughout this chapter, for purposes of clarification, occupational skill standards will be used as synonymous with competencies. Tasks will be referred to as components of competencies or occupational skill standards.

B. THE DEVELOPMENT OF OCCUPATIONAL STANDARDS IN THE STATES

What follows is a summary of the activities taking place in all of the states relating to the development and use of occupational skill standards initiatives. Over 700 separate industry education committees were identified throughout the country being actively involved in the development of skills standards. The source of the material from the states that is analyzed is based on a study conducted by the National Vocational-Technical Education Foundation. The survey instrument is an Appendix in Volume II.

The Drivers

The educational development of occupational skill standards has been driven by the specific needs of industry. It is not an easy task to be responsive to the needs of businesses and industries during a time when there are so many shifts taking place within the total economy. However, the vocational education officials within the states have been in the lead to reach out to industry to establish the frameworks within which such standard setting exercises can occur.

The state officials, of course, must work within the context of the governance and total education infrastructure that exists within their particular state. Such contextual realities have not always made it easy to respond to the needs of industry and business as directly as some leaders would like.

The "bottom line" is that industry and business need employees with skills to do a specific cluster of jobs. Along with these job specific skills, employability, related academic skills, and SCANS skills also are needed. Business and industry use all of these skills requirements to hire, upgrade, and promote employees.

Vocational-technical education's primary approach has been to use occupational skill standards to develop task lists as the basic units of curriculum, instruction, and evaluation criteria to ensure that the students acquire the needed skills for jobs with business and industry. After the Carl D. Perkins Act of 1990, at least 33 states have incorporated occupational skill standards as a criteria for vocational-technical education performance standards. This helps ensure that support structures will be in place to attain the program outcomes required by industry. Specific purposes for development of occupational skill standards by states include the following:

1. Forty-eight states indicated occupational skill standards were established for the purpose of curriculum development;
2. Forty-six states indicated, also, that occupational skill standards and competencies were established as guidelines for courses and programs;
3. Twenty-nine states indicated skill standards were established for the purpose of developing criteria for assessing student mastery;
4. Mentioned also by at least one state were: vocational student organization competitive events; instructional materials development; program approval; program completion; development of minimum competencies, and others.

The Initiators

The development of occupational skill standards most frequently has been initiated by state agencies or consortiums; but in all cases there has been an important involvement of industry:

1. In only six states did business, industry, and education jointly organize the occupational skill standards process;
2. One state, New Hampshire, credits industry and business alone for originating the effort; and
3. The remaining states credit education as the originator.

It is well known that states have, since the mid 1980s, been enacting laws requiring all levels and areas of education to move to measurable and accountable standards. Occupational skill standards are clearly a part of that response. Neither the employers nor those who most needed skilled job training have been satisfied with the education being provided. A massive upgrading of technical job preparation programs is finally being recognized as a key response to these rapid economic and industrial shifts.

Additionally, equity legislation has changed the occupations now open to males and females. It once was uncommon for a man to become a nurse. Today, many men have entered this career. Similarly, today women are accepted in many trades. Education is combatting the problem of gender discrimination in vocational-technical programs in a variety of ways. These include:

1. State occupational skill standards are being examined for gender bias in 37 states;
2. Twelve states directly involve the sex equity coordinator in the development of all occupational skill standards and related curriculum; and
3. Sex equity coordinators in 10 additional states review all occupational skill standards and curriculum for biases.

Influence of Skills Standards on Course of Study

A primary use of occupational skill standards is in the development of programs and courses of study at the local, secondary, and postsecondary district level. State vocational-technical education agencies and divisions indicate the following:

1. Forty-seven states use occupational skill standards as a basis of articulation between secondary and postsecondary programs and courses;
2. Forty-four states indicate standards are the basis for the development of syllabi for courses;
3. Thirty-six states indicate skill standards and task lists are the basis for program certificates of mastery at the postsecondary level; and
4. Forty-two states use occupational skill standards as a basis for testing and assessing skills and tasks acquired.

The Mid-America Vocational Curriculum Consortium's major focus is on the development of curriculum and it brings business, industry and education together as a committee to establish the occupational skill standards lists, according to Dr. Jim Steward, Executive Director. Both educators and business representatives from each state serve on development teams. Both groups are involved in the validation processes.

MAVCC materials are written for occupations which member states are not developing. If a well-developed curriculum based on validated occupational skill standards is available, MAVCC does not duplicate the effort.

Partnerships

Partnerships are built on the needs of all those involved. Business and industry are accustomed to being in touch with their suppliers, and for many occupations vocational-technical education is industry's supplier.

In the development of the occupational skill standards, education sought the help of their business and industry partners, with the following results:

1. Forty-one states called upon managers from business and industry to help form the occupational skill standards committee.
2. Forty-three states actually used incumbent workers or supervisors who had worked for at least two years on the job being studied.

3. Forty states used instructors from the occupational field involved with the partnership, and 34 states used vocational education administrators in addition to instructors.
4. Twenty-eight states introduced a new partner to this development, the academic instructor.
5. Thirty-five states now use curriculum developers to work with the occupational skill standards process.

As noted in Chapter III many states have placed heavy reliance upon partnerships with one another in the development of job analysis materials that are then turned into curricula. The V-TECS consortium has been funded through the states and with both state and federal funds. Currently, V-TECS annual membership fee is $20,000 and in addition each member state must commit to the development of two products per year that are then shared with all of the other states. These products could be the development of test bank items, duty task lists and could cost the state an additional $5,000 to $10,000 a year. This shared cost approach has helped assure the return is significantly greater than independent state work could be. As lessons are learned over the years V-TECS has tightened up both the process and the format in order to help assure common language and understandings between industry and education.

This partnership is managed by each member having the right to appoint one member, to the V-TECH Board, normally it is the director of the Vocational-Technical Education program in the state. Additionally, all of the military services are associate members.

Financing the Development of the System

During the 1970s much of the state development of occupational skills and competencies was financed by Federal vocational education funds (Table 6). States indicate the following:

1. Forty-nine states used federal vocational education funds for development of the occupational skills and competency lists;
2. Thirty-four states used state funds in addition to federal funds; and
3. Only sixteen states used business and industry funds for development of standards.

Estimates of costs to develop one set of occupational skill and competency standards varies widely among states. Costs vary greatly from one occupational cluster to another. Some are more complex and have a larger number of jobs. The highest costs for development of one occupational skill standard area were reported by Florida and Utah. Florida spent $289,000 for the establishment of an expansive health occupations cluster, while Utah spent $504,000 for the development of an equally large business occupations cluster. These costs included industry validated occupational skills and competencies, curriculum development, and related instructional materials. Kentucky estimated their effort to establish skills and related materials in all occupational areas since they started the program twenty years ago to be approximately $1,000,000. States have spent widely varying amounts on occupational skill standards per occupational cluster. The range is between $3,000 to $20,000. The great variance in costs may have to do with the extent to which materials were developed. When lists alone are developed, less funding is

TABLE # 6 FINANCING OF OCCUPATIONAL SKILL STANDARDS DEVELOPMENT

Funding Source	Percent of States Using Each Funding Source
Federal Vocational Education Funds	94
Other Federal Education Funds	12
State Vocational Education Funds	65
Other State Education Funds	25
Business/Industry Funds	31

Note: State responses indicated the use of multiple sources of funding for developmenet of occupational skill standards.

required than when curriculum and associated instructional materials are developed. Also, some costs vary in the development of the standards lists. If a structured group interview process is conducted in various parts of a state, the costs may be higher than when fewer people and validation processes involved.

Approximately three quarters of the states are committed to funding on-going maintenance and revision of occupational skill standards and related competencies and tasks lists. However, actual maintenance and revisions may be accomplished by a local secondary, postsecondary, or higher education institution funded by the state to perform the work for the state. Fourteen states indicate that skill standards development is a local district issue, reflecting the overarching educational traditions in those states.

The cost may have nothing to do with the quality or validity of the occupational skill standards, but may have to do with the number of people involved and the quantity of materials prepared in addition to the actual standards lists.

Extent of Coverage

The National Occupational Information Coordination Council (NOICC) and its state counterpart, State Occupational Information Coordination Council (SOICC), have provided organized categories of job classifications that have been heavily used in the development of the systems. This organized set of occupations provides data on the types of jobs in demand within a state, the jobs considered to be part of an occupational cluster, and basic descriptive information concerning an occupational cluster. They also use this information to determine for which jobs there is the greatest demand, which require more training than others, which are new positions, etc.

This information is supplemented by other information bases including The National Curriculum Network; Consortiums, such as V-TECS and MAVCC; The National Center for Vocational-Technical Education; The Ohio State University Center on Employment and Training; state curriculum centers; trade associations involved in the National Skill Standards projects; and other trade associations. Examples of these include: National Automotive Technician Education Foundation (NATEF), American Hotel and Motel Association, Education Institute (AHMA-EI), and Electronics Industries Foundation.

V-TECS has developed occupational skill standards, which they call catalogs, with duty and task lists identified for approximately 110 occupations. The occupational skill standards and related technical committees developed by education at the state level include 61 occupations within content areas of agriculture, business, marketing, health occupations, trade and technical occupations, personal services, and home economics.

The following tables, Tables 7-15, provide the summary of activity in each of these occupational clusters.

SKILL STANDARDS BY OCCUPATIONAL CLUSTER

Table #7
Agriculture

	Horticulture	Landscape	Production & Mgmt.	Ranching Farming	Mechanics	Animal Science	Natural Resources Forestry	General	Total
Number of Occupational Skill Lists	16	15	15	13	13	13	18	18	120

Table #8
Automotive Technology

	Auto Body Repair	Auto Mechanic, Detail, Parts & Other	Diesel (Heavy Equip. Mech.)	Recreational Marine Maintenance	General	Total
Number of Occupational Skill Lists	16	16	13	12	9	66

Table #9
Business

	Computer (Wordprocessing & Other)	Clerical	Admin. Assistant	Data	Secretarial (Cler., Exec. Admin. Legal)	Non-Degree Acctg	Mid-Mgmt.	General	Total
Number of Occupational Skill Lists	18	16	16	15	16	14	13	32	140

Table #10
Health Occupations

	Technicians (EMT, Radiology, Other)	Nursing (RN, LPN, Asst/Aide)	Dental (Asst, Tech, Other)	General	Total
Number of Occupational Skill Lists	12	17	12	21	62

Table #11
Manufacturing Technology

	Drafting CAD/CAM	Sheet Metal Machinist	Electronics	Industrial Maintenance	Appliance Repair	General	Total
Number of Occupational Skill Lists	16	9	14	11	4	10	64

Table #12
Marketing

	Sales	Marketing	Entrepreneurship	General	Total
Number of Occupational Skill Lists	8	11	9	16	44

Table #13
Printing

	Graphic Comm.	Desk Top Publishing	Commercial Art	Graphic Art	Press Operator	Offset Lithography	General	Total
Number of Occupational Skill Lists	10	8	9	9	6	5	9	56

Table #14
Construction Technology

	Carpentry	Welding	Engineering Technician	Heavy Equipment Operator	Heating, Air Condition, Ventilation & Refrig.	Electrical	Bricklaying/ Masonry	Pipefitting Plumbing	Building Maintenance	General	Total
Number of Occupational Skill Lists	16	11	7	8	12	13	11	11	9	15	113

Table #15
Human Relations

	Elder Care	Cosmetology	Barbering	Law Enforcement	Tailoring, Clothing & Interior Design	Child Care	Food Service	Home Economics (Home Making) & Consumer)	General	Total
Number of Occupational Skill Lists	5	12	5	10	10	20	17	15	13	107

There are separate stories to be told behind each of the numbers and categories listed in the Tables. Issues such as licensure requirements play a heavy role in some clusters, arrangements have been developed with apprenticeship programs to use their skill standards in several of the constructions occupations, manufacturing firms have helped to develop new CAD/CAM standards, individual firms commit their own resources to train the instructors and test students, and the list continues.

Each year updating is required in some areas. The most difficult occupations to keep updated are those with changing technologies such as printing, electronics, manufacturing, automotive, and specialty areas in health technologies. Keeping these expansive occupational skill standards lists up-to-date is one of the greatest concerns of education and its partners.

Although occupational skill standards and related materials are being developed by states, consortiums of states and by apprenticeship groups, no one set of skill standards has been established for all states or is used in every state. Extensive lists of occupational skill standards are available across the nation. However, only 26 to 32 states use a common set of standards for any one occupation. Overlaps may be found in some criteria as a result of a diversified system of occupational skill standards across the United States.

The Standards Setting and Occupational Analysis Process

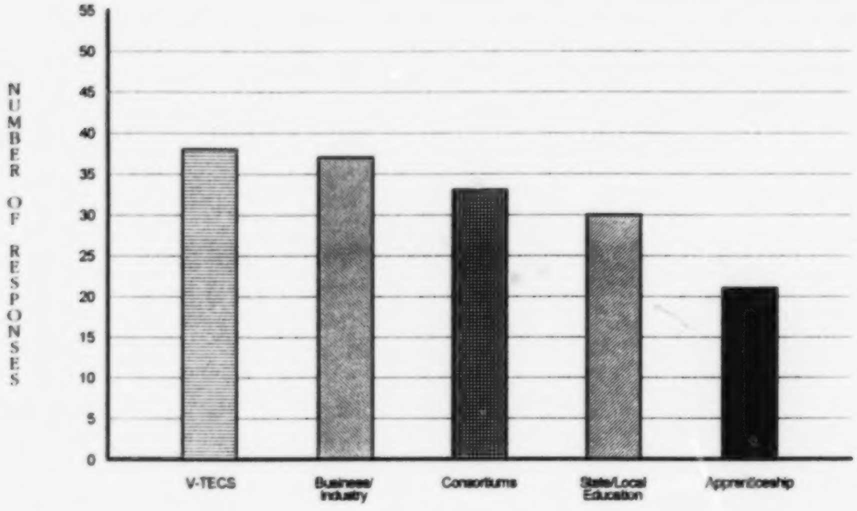
Occupational skill standards are being established at the state level using representatives from industry; incumbent workers and their supervisors; local education administrators and appropriate occupational instructors; curriculum developers, and researchers.

As was discussed in Chapter III validation of the occupational requirements is essential.

1. Thirty-eight states start with V-TECS catalogs to compile a list of existing skills for a selected occupation.
2. Thirty-three states use consortium lists and materials. Among consortiums used to develop a basic list were the following: Mid America Vocational Curriculum Consortium (MAVCC), Individualized Distributive Education Curriculum Consortium (IDECC), National Network for Computing Curriculum for Vocational Technical Education (NNCCVTE), American Agriculture Association for Vocational Instructional Materials (AAVIM), East Central Network for Curriculum Coordination (ECNCC), and others.
3. Thirty-seven states use lists developed by business and industry as a starting point. Arkansas and Oklahoma most frequently use business lists as their starting points.
4. Thirty states use previous state and local standards lists as starting points for developing new standards. South Dakota, North Dakota, New Mexico, Delaware, and Pennsylvania use their previous state lists while Utah, Florida, New York, Ohio, and Wyoming use combinations of other states' lists, as well as their own. Maryland uses previous DACUM lists.
5. Twenty-one states use apprenticeship lists as a starting point for skill standard development.

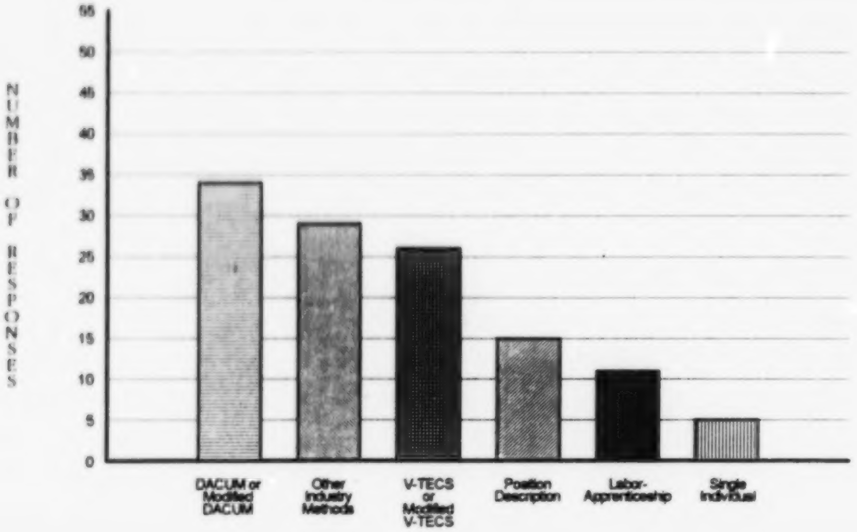
Figure 6 details the sources of materials used to establish occupational skills standards.

FIGURE 6 SOURCES OF MATERIALS USED TO ESTABLISH OCCUPATIONAL SKILL STANDARDS



Note. *State responses indicated that multiple sources of materials were used to establish skill standards*

FIGURE 7 PROCESSES USED TO ESTABLISH STATE LEVEL OCCUPATIONAL SKILL STANDARDS LISTS



Note. *State responses indicated the use of multiple processes in the development of skill standards*

In establishing occupational skill standards, most of the states, as seen in Figure 7, use a process involving input from workers in jobs for which these standards are being developed. These processes include the DACUM or modified DACUM process, the V-TECS or modified V-TECS process, and various other processes utilizing workers and others.

Thirty-four states use DACUM or a Modified DACUM process for the establishment of occupational skill standards and competencies. Modifications may include starting with validated or invalidated sets of skills developed by earlier groups from industry or combinations of education and industry/business.

Twenty-nine states indicated they use another industry process utilizing workers and others. Some examples include the incorporation of occupational analysis and the utilization of input from postsecondary instructors. Twenty-six states use the V-TECS or a modified V-TECS process for the development of skills, and performance objectives with business and industry. Modified processes may include variations by states in accordance with already established processes with business/industyr. Fifteen states indicated the use of position description or task analysis at the job site as a primary method to develop occupational skill standards.

A labor-apprenticeship process is used by 11 states to establish occupational skill standards. A system developed by the federal Bureau of Apprenticeship and Training provides skill and task lists which are sanctioned by federal and state agencies as a basis for training and certification. In addition, many labor unions have certified apprenticeship programs which have labor - and industry - sanctioned task lists for the purpose of training and certification.

A combination of the described processes is used by 20 states to establish their occupational skill standards. Virginia uses a curriculum center to prepare tentative task lists from all available sources. A modified DACUM process, technical committee, or both are convened to validate or revise tentative lists. Then, curriculum is constructed according to the validated occupational skill lists. Vermont conducts instructor curriculum round table meetings to define program areas and create rough drafts of competency lists. These lists are validated by a state technical committee.

Some states use the Ohio Competency Analysis Profiles which is an expanded, modified DACUM process and committees developed model curricula which subsequently was validated by educators, business, industry, and commerce.

Iowa requires minimum competency lists containing essential occupational skills which lead to entry level employment. However, these are not intended to be the only competencies learned by students. Many additional competencies exist within Iowa programs.

Colorado community college faculties describe the common elements of secondary and postsecondary curricula and guarantee articulation, statewide, between these two levels of education.

The Assessment Process

Although assessment is a key component of the occupational skill standards system, less than one half of the states have developed and validated test banks at the state level. More than one-half of the states indicate that local districts within their boundaries have test bank questions available for instructor use (Table 16).

At least 30 states indicated they do not validate test banks. Arkansas, Florida, Georgia, Oklahoma, South Carolina, and Wisconsin are among the states which do have validated test banks available.

TABLE #16 AGENCIES AND GROUPS PROVIDING ASSESSMENT AND CERTIFICATION FOR OCCUPATIONAL SKILLS ACQUIRED

Agencies and Groups	Percent of States
Local Education	58
State Vocational-Technical Education	46
Business/Industry	44
Labor	21

Note: State responses indicated multiple agency involvement in the assessment and certification of occupational skills

Sources of test bank items other than at state or local levels, include V-TECS Test Banks, SOCATS, and NOCTI.

Of the states that have test item banks one of the most extensive is Oklahoma, which has items for occupational skills, related academics, and employability skills. Other states which have developed test items or test item banks at the state level include: Arizona, Florida, Michigan, North Carolina, Utah, Vermont, and Wisconsin. In addition, Minnesota and New York have local test item banks for secondary and postsecondary levels. New Hampshire and Oregon are in the process of creating tests. Florida has developed more than 30 test item banks coded to statewide curriculum frameworks. Michigan has a microcomputer-based test item bank to provide teachers with test items directly related to the curriculum taught in their programs. The program allows the user to randomly select test items for tasks they have identified. North Carolina's development of computerized test item banks is approximately 50 percent complete.

Types of tests or assessments used to determine mastery of occupational skills include written, computerized, cognitive, simulation, situation, actual performance, and combinations of tests.

1. Forty-one states use written cognitive tests, with only one half of these using computerized versions of such tests.
2. Simulation is used by 26 states, while 23 states use situational tests.
3. Thirty-eight states use actual performance tests. These range from local, district- developed tests to sophisticated tests such as SOCATS. Most use student performance in the classroom, laboratory, or shop as a means of assessment. In some cases, these tests are performed at the job site.
4. Nearly one half the states use a combination of testing processes to determine mastery of skills. Examples include:
    a. Ohio uses both cognitive and performance testing to determine competencefor the Career Passport, a document which accompanies the student to business or industry. Ohio uses ACT Work Keys as an assessment process.
    b. Oklahoma is using cognitive scenarios and performance to test competencies.
    c. Utah uses simulation and situational tests.
    d. Kentucky is presently developing performance tests.

Vocational-technical education during the past 10 years has developed curriculum in applied physics, math, chemistry, biology, and communications. States pooled resources and, through consortiums with the Center on Occupational Research and Development (CORD) and the Agency for Instructional Technology (AIT), developed these materials.

Assessment of these skills, along with occupational skills and employability skills, is essential. As seen in Table 17, states include in their assessments of vocational-technical students, academic competency lists in math, science, communications, and reading. Forty-two states test communications and math skills, 40 states test science skills, and 35 states test reading skills. Examples of states which test for all areas of academics include the following:

1. Louisiana includes all of these areas in the curriculum, as well as testing.
2. Maine has developed the Maine Education Assessment (MEA) to incorporate these skills tests.
3. Illinois is establishing a testing program to incorporate all areas.
4. Pennsylvania tests for all academics, as well as occupational competencies.
5. Minnesota assesses academic and occupational skills, but tests are designed in each local district.

Employment-related skills are assessed in several areas, including problem solving, thinking skills, and team skills; resume and application writing; and human relations on the job.

Forty-four of the states include these areas in assessment of occupational skills attainment (Table 17).

Testing and assessment of skills is tied directly with instruction in most states. There is very little evidence to indicate that any one state or field of vocational-technical education is moving to large scale independent assessment of skills. Certifications of skills practices are usually in the form of profiles, check sheets, certificates with lists of competencies attained, computer printouts of skills mastered, or similar records. Ohio includes its certificates and lists of competencies attained in the Ohio Career Passport. Oklahoma and Arkansas have strong testing programs. Most portfolios and records of competencies mastered are completed by the local secondary or postsecondary program. As indicated earlier, some states are moving to a valid and reliable testing system, but this is not yet widespread throughout the country. The costs for such a system may be prohibitive for small states, making some form of consortia the most practical approach while, allowing states to retain some flexibility to meet special needs within their states. Local systems are closest to the student but have the least time and resource capability to ensure consistency and validity.

TABLE #17 ACADEMIC COMPETENCIES AND EMPLOYMENT-RELATED SKILLS INCLUDED IN OCCUPATIONAL SKILL ASSESSMENTS

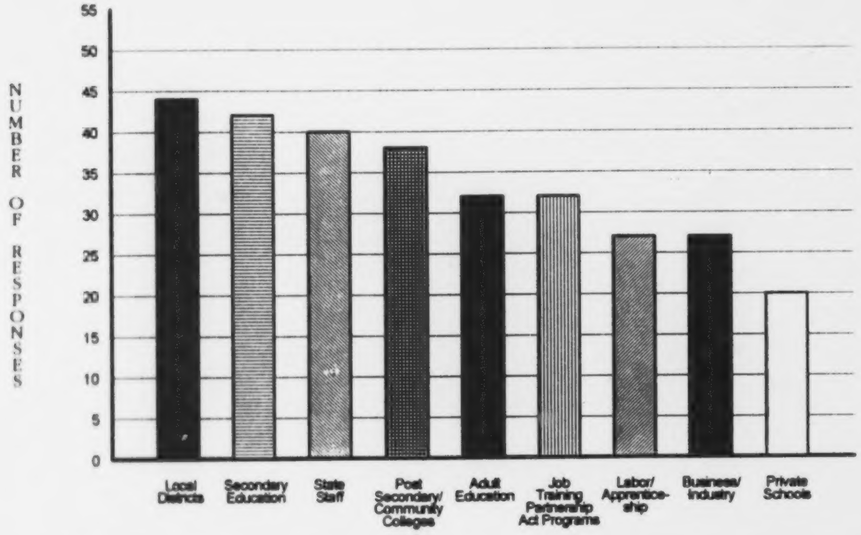
Related Academic Competencies	**Percent of States**
Math	81
Communications	81
Science	77
Reading	67
Other	8
Employment-Related Skills	
Problem Solving and Related Skills	85
Resume and Application	83
Human Relations on the Job	83
Other	19

Note: State responses indicated inclusion of multiple categories of related competencies and skills in occupational assessments.

Use of the Standards

The greatest usage of the occupational skill standards is by local districts. They are used equally by administrators and instructors. Secondary schools in 42 states, postsecondary institutions in 38 states, business and industry partners and apprenticeship programs in 27 states, and Job Training Partnership (JTPA) programs in 32 states use the occupational skill standards. The partnerships with business, industry, apprenticeship, and JTPA provide an opportunity to share occupational skill standards as a common base for skill development and employment practices. (Figure 8).

FIGURE 8 GROUPS USING OCCUPATIONAL SKILL STANDARDS



Note. *Responses indicated many groups within any given state use occupational skill standards*

The Performance Standards that were established under the Perkins II require vocational-technical education programs to be evaluated by a given set of standards. One of the challenges the states are facing is how to mesh the specific occupational skill requirements for individuals with the performance standards. There is a need to link the two sets of standards. Clearly, it is too early for all of the details to have been settled, but states indicate that a strong relationship between the occupational skill standards and the performance standards exists. Thirty-three states require local programs through the Performance Standards to use occupational skills and competencies. In addition, 41 states require, as a part of the performance standards, vocational-technical education programs to have business and industry partnerships. Therefore, a strong relationship is being built by states between performance standards and occupational skill standards.

As can be observed building blocks exist within the education system to promote, cultivate, adjust, and expand the development of a national voluntary system skill standards systems. However, as will be noted in the review of Volume II of this report that provides more detail information regarding current activities in the states there are some barriers that will need to be addressed. Nettlesome issues such as how to assure the instructional staff (both academic and vocational) is sufficiently knowledgeable of the needs of industry has been identified as a substantial barrier. Development of a more sufficient and affordable assessment system that carriers with it the portability deemed of value by industry will need to be addressed. Encouraging usage by more local school districts and other education and training providers all present examples of issues that need more attention.

CHAPTER VIII

INDUSTRY DRIVEN SKILL STANDARDS SYSTEMS

A. INTRODUCTION AND BACKGROUND

It has been shown that industry representatives have been involved in providing education institutions with information necessary to develop curriculum to meet the changing needs of the workplace, through consortium of states, or within states. There are additional venues within which industry associations and organizations representing a specific occupation influence the offerings of educational institutions or training programs, or the assessment of an individuals skills and knowledge. We now turn our attention to the role of national industry and occupation focused organizations. It is important to note at the outset that the term "skill standard" has traditionally been a technical one -- not a policy term. Policy discussions tend to use the term "credentialing", and what follows discusses the issue using that term.

The certification of competence of individuals is embedded within a larger framework dealing with credentialing that touches every professional and academic institution. Credentialing activities can include:

1. prescribing education and experience qualification for certification candidates;
2. establishing for potential accredited institutions qualifications for curriculum, faculty, and facilities;
3. administering competitive exams; and,
4. conducting assessment visits.

Proponents of the private sector taking the lead to perform many of these functions argue that it is more effective for the private sector to perform these self-regulatory functions. (Jacobs:1992) The essence of these arguments is that self-regulation prevents costly and cumbersome government regulation and that the privately driven approach to credentialing requires the providers of the service to stay close to the changes in the marketplace.

Self-regulation of credentialing, is very much an American strategy. By far the typical pattern in other industrialized countries is for government to perform the credentialing functions. Yet even in America it would be erroneous to assume that government is not a substantial player in the field. At times government has been the initiator, supporter and indeed partner in this complex arena.

The industry associations that have become involved in the development of both accreditation and credentialing programs have entered into the arena of regulatory policy and therefore have had to pay attention to the key roles of participants, the representation of interests and the design and performance of the system of rule making, monitoring and enforcement. As Lad notes, ...self-regulation is public policy, requiring scrutiny of how decisions are made and how they affect the public. (Lad:1992)

The Focus of this Study

The growth of private organizations engaged in credentialing has expanded considerably since a survey was conducted in 1965. At that time 120 private organizations were providing such services. Estimates now are that this number is five to ten times higher. (Jacobs,1992) The results of this study will not yield a definitive number for a variety of reasons. A key reason is that the focus of the study has been on the occupations not normally requiring a four year college degree or more as minimal entrance requirements. Therefore, information was not sought from organizations that classify themselves only as professional societies (e.g. social workers, lawyers, medical doctors).

The study centered attention on the national trade associations that, as part of their mission, directly provide or sponsor, through an affiliate or subsidiary arrangement, a certification service. These associations were selected using the *Encyclopedia of Associations*. Please be aware that this publication allows the organization to self-select how they wish to be described. Because of this policy, some organizations fitting the definition of a professional society are included in the listing (even though there is a separate category for such bodies by the publishers of the Encyclopedia).

The journeyman card represents a form of certification that does not fit into the trade/professional association category. However, the apprenticeship and upgrading programs jointly sponsored by labor/management committees were considered a part of the industry driven skills standards development "system" for the purpose of this study. The examples of apprenticeship programs were culled only from those programs that have nationally recognized standards (excluding the military which has the largest number of nationally recognized programs) from the Bureau of Apprenticeship and Training (BAT) of the Dept. of Labor.

It is recognized that individual companies have established internal skill standards for their own use and these are often considered to be proprietary. They have been developed to assist the firm's competitive position in the marketplace. The study was not designed to capture any of these firm-specific skill standards nor was there a review of the apprenticeship programs/standards that are sponsored by individual companies.

The study design was constrained by a Federal Office of Management and Budget rule that no written surveys could be administered without permission and the time lines and resources available for the study made the use of standard survey methods not feasible. Given such constraints the willingness of many associations to provide off-the-shelf information regarding their certification programs was impressive. This information was enhanced with the addition of material from such organizations as the American Society of Association Executives, the National Organization for Competency Assurance, the National Commission for Certifying Agencies, information in the files of both the Departments of Education and Labor and the files of the study team.

From these various sources a substantial (one could even say overwhelming) amount of information was collected. The descriptive material is in **VOLUME III** of this report. Below is a synthesis of the findings. There emerges a portrait of how the private sector is deeply engaged, or in some sectors not engaged, in the development and maintenance of one or more forms of credentialing.

By far the two most predominant forms are participation in the program accreditation process and in the certification of workers, normally through the use of nationally validated tests and other forms of performance assessment.

B. COMMON PATTERNS

Gaps and Coverage

There are major industry sectors that do not have a tradition of promoting industry wide skill standards. Among these are agriculture, mining, retailing and large portions of manufacturing. Clearly these industrial sectors employ certified individuals such as engineering technicians, records management specialists, professional secretaries and a host of others but these represent occupations that cross industry boundaries. Manufacturing firms are often involved in sponsoring apprenticeship training programs that are frequently firm-specific and enrollees are culled from the existing workforce. Most enrollees have gained some level of seniority and the course of study and the ultimate certification may or may not reflect cross enterprise standards.

It is possible that the agriculture sector has not felt the need to become deeply involved in either accreditation or certification due to the traditionally strong base of education's (institutional) support for training employees for this sector at both the secondary and post-secondary levels. The retail sector may not have perceived a need to become deeply engaged due to the way the industry has evolved with a strong reliance on hiring a large cadre of individuals in the "youth labor market" as well as a large number of part-time workers.

By far the largest number of certification programs are directly related to occupations and industries where there has been (a) intervention by government to regulate the industry or (b) threat of government to regulate the industry and certification of individuals has been the route selected by the industry to impose some form of self-regulation upon itself. Health care and real estate reflect examples of the first type and direct selling is an example of the latter model.

Another common pattern is that most of the certification programs reflect specialties or market niches. Appraisers and financial and insurance service certification programs exemplify this pattern as do certifications for apartment and other types of commercial building managers.

Many of the certification programs are geared towards occupations where there is not a large concentration of workers performing the same function at a particular work site. Again, this reinforces the specialty pattern. In some instances these specialty workers must be familiar with laws and regulations such as building codes.

Table 2 shows the distribution of existing skills certification programs by major industry and occupational group. The numbers in each cell identify the number of separate industry or occupational association based certification programs identified by the IEL survey. The shaded cells indicate industry/occupation pairs containing few workers in the labor force: The indicated industry sector accounts for less than 5% of total employment in the occupation group. A total of 168 certification programs were identified. Over half (85) are primarily associated with occupations in the Service Sector of the economy. The second largest number (25) were found in the Finance, Insurance and Real Estate Sector. Twenty programs were deemed to be cross-cutting with respect to industries: no single industry could be identified as the primary focus of the program. These cross-cutting programs were predominately associated with management specialties and administrative support occupations. Management-related skills certification programs comprised the largest single occupational group (56), followed closely by professional specialty occupation group programs (31). It appeared that many of these programs served college educated workers. The industry and occupation categories used in the table correspond to Occupation Employee Survey aggregate groups definitions.

The Role of Industry Associations

In very few instances was there found a single industry association that represented the total industry, offering the only certification programs used by all of that industry. Often the inclusive industry certification programs are in areas where total employment is relatively small, such as the association representing the locksmiths or farriers (horseshoers). However, unless the occupation is tied to licensure requirements (discussed later) full certification coverage of the practicing employees does not occur.

There are other examples of certifying organizations that come close to representing the total occupational grouping (not the industry per se) such as the American Welding Society that provides support to a wide range of sub-industry groups that require competencies in welding.

These findings to coverage are not surprising given that most of the industry associations are, themselves, specialty organizations. While they may have special membership categories or act as the convener of several related organizations, the particular specialty that is the association's focus will drive certification programs.

There is a strong pattern of influence that emanates from a primary profession such as engineering, accountancy, or medical over the certification programs that recognize the technical workers within the same field. For example, many of the allied health fields are clearly modeled after the medical or dental preparation programs for doctors where there is a firm belief that the core of the profession is rooted in a common body of knowledge that must be acquired as a pre-condition for being eligible for an examination or some other form of certification. In such instances there is often a strong relationship between an accreditation body and the certifying body even though they are separate entities. Additionally, these certification programs are often directly linked to a requirement that an individual must pass some form of licensure examination (in order to practice in a given state or provide services for a federally funded program such as public housing management or approving loans for a federally insured program).

Table 2
Existence of Skills Certification Programs
Numbers in cells are counts of certification programs
(Shading indicates industry sectors having less than 5% of indicated occupation employment)

Occupation Group	Industry												
	Agric.	Mining	Constr.	Manuf.	Transp	Comm.	Wholes. Trade	Retail Trade	Fin. Insur.& Real Estate	Serv.	Govt	Non specific	Total
Executive, Admin & Mgmt.	▨ 1	▨	2	2	▨ 1	▨ 1		4	9	23	1	12	56
Professional Specialty	▨	▨ 1	▨	2	▨	▨	▨	▨	▨ 3	21	3	1	31
Technicians	▨	▨	▨		▨	▨ 1	▨	▨	▨	14		1	16
Marketing	▨	▨	▨		▨	▨	1		11	7	▨		19
Admin support	▨	▨	▨		▨	▨			2	1		6	9
Service	▨	▨	▨	▨	▨	▨	▨		▨	6			6
Agriculture		▨	▨	▨	▨	▨	▨	▨	▨	1			1
Precision Production	▨	▨	7	2	▨		▨	4	▨	11			24
Operators	▨	▨		4	1	▨			▨	1	▨		6
Non-Specific													
Total	1	1	9	10	2	2	1	8	25	85	4	20	168

Other certification programs appear more driven by the technologies of the workplace and while the association is often involved in the promotion of education programs (their own and others they recognize, including public education institutions,) they have not developed formal accreditation programs.

Characteristics of the Certification Programs

In many ways the current state of affairs means that the old adage "let the buyer beware" holds sway when discussing certification and credentialing programs. This observation is not made to pass judgement on any organization or institution but simply to note that one cannot assume that a person claiming to be certified or credentialed has completed an assessment of skills and knowledge in a program that has validated the standards or the assessment instruments. Nor is it always the case that a common body of knowledge has been developed that is nationally recognized as reflecting the essential characteristics of an clusters of common occupations.

Even with these notes of caution there is much to be said for many of the programs that have emerged overtime.

The Patterns of Practice

There are some common patterns in the certification systems.

1. Most programs only offer one or two recognitions;
2. Most are linked to time in the workplace;
3. Most have alternate paths that allow a candidate to credit schooling (particularly from an approved program of study) with less time spent in the workplace prior to being considered minimally qualified to sit for an exam or other form of assessment;
4. The overwhelming model is to assess knowledge through passing a paper and pencil test. These can take anywhere from an hour, to half a day, to two full days per test;
5. Most have some form of required recertification based on continuing education and professional development activities; these ordinarily must be achieved within a specified time period. However, there is a growing pattern to require testing or some form of documented performance assessment for continual certification;
6. Most have permitted a time limited period for "grandfathering" members of the profession without requiring the individual to sit for the exams.
7. Most have developed a core body of knowledge that is required in order to qualify minimally for being considered a candidate (all of the nationally significant programs have done this).
8. Some have established linkages with recognized organizations such as the American Council on Education in order to have the passage of an exam count for college credit.

There are some that have established career paths and varying levels of recognition beginning from entry-level competencies to master levels, as will be noted in some of the examples discussed in Volume III.

As the programs grow in number and mature, the issue of recertification is gaining increased attention. This is particularly true in occupations where technologies are changing rather rapidly. The concerns center around maintaining credibility ana public confidence in the certification. The most typical form of keeping up has been the requirement for certificants to take continuing education courses. Individuals are encouraged to take courses offered by the sponsoring association. However, it is a dubious legal practice only to recognize courses from a single provider so many organizations have now "recognized" other education providers' programs or have said the courses can be acquired through a formal accredited program that is accepted by the industry and COPA.

Management and Financial Issues

While the role of the sponsoring industry association varies considerably, many of them derive substantial income from the sponsorship of education related activities that sometimes tie into the credentialing program. However, as was discussed in Chapter VI it is legally prudent to maintain administratively separate and independent governance organizations that have oversight responsibilities for the certification and accreditation programs. Clearly not all of the associations have been as careful about such interrelationships as they should be in order to avoid the threat of legal review by either the Federal Trade Commission or the Department of Justice. However, many of the certification programs that could be called "nationally significant" have generally complied with these self-regulatory standards.

It is often the case that non-profit organizations are established by a single trade association or, in some cases, by several trade associations to support research, development and certification program cost. In some instances these non-profit organizations have the responsibility to set product standards as well as establish skill standards for individual certifications.

There is a specialized industry of test developers and test givers that are often called upon to provide the technical expertise to conduct the job analysis, develop the test items and often administer the testing process and sometimes maintain the registry. The association promotes the certification program, provides the experts for reviewing test items and assessing essays or other forms of proof of competence such as a business plan, etc.

When a choice is made to contract out the development of the tests and assessment instruments, a wide array of private and or non-profit organizations exist to provide support. Examples of these include, The National Occupational Competency Testing Institute (NOCTI), Educational Testing Service (ETS), American College Testing (ACT), American Institute for Research (AIR), the National Assessment Institute, and the Professional Examination Service.

A "new to this country" organization is the North American subsidiary of the Cities and Guilds. This organization has its roots in the United Kingdom (U.K.). One of the oldest independent individual certification organizations in the world, it's approach in this country will follow that of the U.K. and it will offer its own certificates in a wide array of occupations.

As noted earlier, recertification is becoming a larger issue for many of the programs, yet many associations have found that members are often resistent to the requirement that some form of testing be a part of the continued recognition. Without the passage of some test and other assessment of skills it is necessary for the sponsoring certifying agency to keep records of proof that the individual has complied with the recertification requirements. This task apparently has proven to be somewhat challenging for some of the smaller organizations and they have adopted a process that notifies the registrants that a certain percentage of those certified will be audited each year and they must show proof they have lived up to the requirements.

There is a reality for any voluntary certification program that promotion is a part of the management tasks. Individuals must be encouraged to become participants and employers must be encouraged to utilize the certification in their hiring and promotion policies. Trade association meetings are often used for both types of promotions by certifying bodies. Due to this dependence there is sometimes tension between the certifying organization and the sponsoring trade association that would like to have more influence over the certification program or share in the fiscal rewards of a successful certification program.

Perhaps one of the most impressive features of certification programs is the willingness of volunteers to contribute substantial time and energy to support the effort. It would be impossible to estimate the value of these contributions. Without the cast of thousands that often give of their own time, it is probably fair to say that there would be no self-regulatory/voluntary certification programs in the country. However, volunteers cannot do it all. Most programs are eventually able to become self-sustaining by charging a variety of fees for different parts of the certification program.

A review of the fee structures show several common patterns. It is typical to see application fees, study guides and textbook fees, individual test fees, and continual registration fees all used to help defray costs. There is also a pattern of higher fees for programs that do not have a large potential pool of applicants or where the opportunity for substantial income is possible. Or a higher fee will be charged to the applicants in order to recover development cost. This is perhaps not a substantial problem for higher income occupations but clearly it is of concern for occupations where the wage rates are moderate or low for entry-level workers.

In all cases where a trade association is a key sponsor there is a different fee pattern for the association members versus non-members. These differences must be reasonable or the association can run afoul of the federal regulators.

Speed in the development of programs is directly related to the issue of money. If there is no up front "seed money" from either the parent trade association or professional society it can take several years for the examination and other forms of assessment to become realities. Staff responsible for the development of the programs are often forced to justify developmental costs to the point that sometimes corners are cut or programs are abandoned. There are some instances where test development and test administrator enterprises have agreed to share the development cost based on the business assumption that a sufficient market exists of potential applicants to recover the costs.

The total cost varies, in part based on the decision to contract with test developers, but several hundred thousands of dollars are required (including voluntary time of experts) to launch a substantial and credible program.

Program Recognition or Accreditation

One of the stated goals of the federal government's initiative is to promote a competency based system that builds, into the education and training curricula, requirements for workforce skill and knowledge identified by industry. It has already been noted that the term "competency-based" has yet to achieve common meaning among the different stakeholders that must necessarily be involved in the development of this new system. This goal, if realized, will represent a sharp break with current practices on several fronts.

The typical pattern that has been promoted by industry when supporting accreditation programs has been to develop agreement between educators and themselves on what is often called the common body of knowledge required to practice in a profession. This provides the core rationale for the need to have specialized accreditation bodies at the post-secondary level of education. In addition to assuring that an education institution provides courses that contain the common body of knowledge, accrediting bodies also consider a host of other issues. One of the key items they consider is the qualifications of the faculty. The accreditors want to assure that these individuals remain knowledgeable of trends in the industry. Equipment used in the education process is another item of concern for some accrediting bodies. It will often be the case that some form of work site practicum or internship is required of the students in a specialty-accredited program.

At the core of the accreditation process is a self-assessment process that an institution undertakes to determine if it is in compliance with the commonly agreed-upon program standards of the accrediting agency. After the self-assessment phase, the institution undergoes a peer review conducted by individuals selected by the sponsoring body. There are time limits on the approval, normally lasting five years before the cycle is repeated.

This accreditation model contains a substantial set of common principles used by many of the nationally-recognized apprenticeship programs. These apprenticeship programs also have developed a common body of knowledge; concern with type of equipment used; and, the qualifications of instructors have proven to be of paramount concern in many of these programs. Indeed many of the apprenticeship program staff often note the most important quality assurance factor in their programs is the instructors.

These two forms of traditional quality assurance also have in common a program that is essentially time based. Additionally, the specialty accreditation and apprenticeship programs are primarily geared to a post high school period of training.

There is a small, and perhaps instructive, emerging effort on the part of some industry associations that have traditionally drawn entry-level workers from the ranks of high school graduates to emulate the accreditation approach at the secondary level of schooling. These efforts are sometimes described as program certification. *They often use the same categories such as instruction, qualification of staff, type* of equipment, etc. that accreditation programs use to certify a high school program. The curriculum is often described as "competency-based" due to its development having involved industry representatives. There are however, limited examples of national organization's sponsorship of such efforts.

For many occupations graduation from an accredited/certified specialty program has proven to be a sufficient entry level credential. However, it is instructive to note that, a substantial number of the industry trade associations that are deeply involved in the sponsorship of accreditation programs are also involved in a certification of an individual's competencies in a separate program effort. As one individual interviewed stated succinctly -- an accredited program only allows an individual to learn -- the certification testing process finds out what they learned. (This may or may not be true but it is said nicely and summarizes the rationale for the coupling of the efforts.)

Suffice it to say that one of the more important challenges that will need to be addressed in the United States will be deciding what is meant by a "time-based" v.s. what is "competency-based" education.

C. THE APPRENTICESHIP APPROACH

The cost for the apprenticeship model of credentialing is often supported by a self-imposed tax that employers pay as result of collective bargaining agreements or by the choice to sponsor such a program. In these programs, the costs often include the development of curriculum, training of instructors, the development of tests. In most of the joint union/employer sponsored programs, apprentices do not bear any of the related training costs nor are testing fees required. It is not typical for apprenticeship programs to have a set of tests or other forms of performance assessment that come at the end of the apprenticeship period. If there is a nationally recognized program that includes passage of tests, they are given throughout the apprenticeship period and continued participation in the training is contingent upon the passage. However, there are no requirements that an approved program include such a quality assurance mechanism and this has, in some instances, caused problems in the "portability of the credential" from one community or state to another.

The certification of competencies that come from an apprenticeship type training program follow the first form of credentialing -- prescription of education and experience -- with the testing closely akin to the traditional approach used by education institutions -- taking the test at the end a particular course. The test may or may not have been nationally validated.

The Seafarers apprenticeship/upgrading programs are unlike some others, in that in several instances, the skills certification are ultimately documented by the government agency, most often the U.S. Coast Guard, that directly administers tests to enrollees.

D. CONCERN ABOUT THE INSTRUCTORS -- IN THE SCHOOLS AND AT THE WORK SITE

There is a consistent theme, indeed concern, that permeates almost all of the industry associations that are involved with any form of credentialing -- the qualifications of instructors.

As already noted, several of the national apprenticeship programs invest considerable time and energy in preparing experienced industry workers to perform the all important task of providing the related instruction.

Many of the industry certification programs have developed a screening mechanisms to vouch for the quality of instructors that can be used in their own education programs. The specialized accreditation and program certification programs also place a great deal of emphasis on the quality of instructors and, in some cases, the educational institutions' tenure policies are sharply criticized by members of the industry who are not convinced that all of the instructors have "kept up" with the changes in the occupation and or industry.

There is also a related and important issue regarding the quality of instruction that takes place at the work site. This concern has been addressed in varying ways. For programs that have prescribed education and experience qualifications for certification candidates -- internship, cooperative education, apprenticeship program -- this has often meant that the individual who is the work site supervisor must themselves, be "certified" in order for the student to gain either the needed credits for graduation or progression.

As will be noted in several of the examples of industry supported programs discussed in Volume II, the search for the necessary training support at the work site continues to be a problematic issue.

E. RELATIONSHIP TO LICENSING

The merits of licensure are not the focus of this study but it is impossible to ignore the connections of voluntary credentialing programs with that of the government authority to control who is allowed to practice in an occupation.

Complex is the operative word regarding the relationship of licensing and voluntary credentialing systems. The world of licensuring is complex by itself. The construction and building maintenance industries are often required to meet local licensure requirements; however, most of the licensure standards are established by state governments and permeate several industries such as health, allied health, accountancy, real estate, some financial services, cosmetology, and the legal professions.

The federal government also is involved in some licensure requirements in such areas as nuclear power, marine occupations, air traffic control, and others where this level of government rule making supercedes state authority to protect the health and safety of public.

Often associations representing a particular occupation aggressively seek the government-required licensure by way of controlling entry into the practice of the occupation or to help members address potential health or safety liability legal claims.

There are obviously mixed opinions regarding the role of government. While there are strong advocates for minimal government activity in this recognized self-regulatory arena many professional associations are strong advocates of licensure requirements and have lobbied state legislative bodies to advance this position. There are often contentious debates when states consider such legislation with businesses and other closely related occupational interest groups often opposing the sought after recognition.

Many voluntary certification and accreditation organizations have close working relationships with state licensure boards. For example, the American Institute of Certified Public Accountants (AICPA) works in concert with the National Association of States Boards of Accountancy to advise state regulators regarding which education programs meet the academic requirements AICPA believes meet the appropriate course of study needed by the applicant to sit for the CPA exam. Additionally, AICPA develops and administers the nationally recognized CPA exam that is used by the states as proof of competency. AICPA is clearly not alone in such a working relationship with the state licensure community. This pattern is followed by the health and allied health fields and others.

In some of the licensed occupations there is a level of disdain on the part of national organizations regarding the value and worth of the some of the state exams. The essence of the criticism is that the exams often represent the minimal knowledge required to practice the craft or occupation and do not address the full range of knowledge required to practice as a full, well-rounded professional.

These intertwined relationships clearly blur the purist arguments that certification and accreditation are totally a self-regulatory matter or that, in some cases, whether certification is truly voluntary -- if the individual wants to be employed in the effected occupation.

Table 18 shows the distribution of occupational licensure programs by major industry and occupation category. The table was compiled from information listed in Volume III, Appendix B. Each licensure program was identified in terms of the industry and occupation groups in which the licensed workers were primarily found. The identified licensure programs were analyzed to match primary industry and occupation categories. The focus of licensure program selection was to identify programs where licensure typically incorporates some degree of skill, competence or knowledge requirement. It was found that the largest number were associated with the service industry sector. Professional specialty occupations accounted for the largest number of licensure programs.

F. SOME UNSETTLED AND CONTINUING ISSUES

Each of the previous chapters as well as this one have noted several sets of issues that will need to be addressed as the next steps are taken in the development of a national skills standards systems. However, it is important to note a few more that have not yet been discussed.

Table #18
Licensed Occupations by Industry
Numbers in cells are counts of licensed occupations
(Shading indicates industry sectors having less than 5% of indicated occupation employment)

Occupation Group	Industry											
	Agric.	Mining	Constr.	Manuf.	Transp	Comm.	Wholes. Trade	Retail Trade	Fin. Insur.& Real Estate	Serv.	Govt	Non specific	Total
Executive, Admin & Mgmt.	▨	1	5		▨	▨				2			4
Professional Specialty	2	1	▨	3	▨	1	▨	1	▨	35	4		46
Technicians	▨	▨	▨	1	1	2	▨	▨	▨	11			15
Marketing	1	▨	▨		▨	▨			8		▨		9
Admin support	▨	▨	▨		▨	▨					3		3
Service	▨	▨	▨	▨	▨	▨	▨	2	▨	7	3		12
Agriculture	6	▨	▨	▨	▨	▨	▨	▨	▨				6
Precision Production	▨	3	8	1	1		▨	1	▨				14
Operators	▨	▨		3	4	1			▨	2	▨		10
Non-Specific													
Total	9	5	13	8	6	4		4	8	57			115

Sources: (1) Council on Licensure, Enforcement and Regulation. (1991). Issues in Professional Regulation. Washington, DC: The Council of State Governments. (2) Joan L. Wills. (1992) A Rambling Path for Certification of Skills. Washington, DC: The Institute for Educational Leadership.

There is no common framework that guides the development and implementation of the programs and systems. Common language is a powerful tool but no common language exists between and among the programs and the education community at large, let alone among the general public.

There is also a clear pattern of parsimony. There are few certification or credentialing programs that are targeted to the entry-level workforce. Even within industries that hire young first-time job seekers, the certification programs do not focus on entry requirements. Also most of the programs do not promote a graduation of knowledge and skills to reach the high end or, master level.

Another substantial concern is competition among professional associations, certifying/accrediting groups, and even licensure bodies. Without denying the value of competition and the value of market forces there may be a need to set some parameters.

An illustrative -- though by no means isolated example -- of an occupation where accreditation, educational requirements, certification and licensure issues are unsettled is the nursing profession. The system is driven by the members of the occupation. In 1984 there were 85,000 certified nurses. By 1987 there were 148,000 and the number is steadily increasing. The federal government supported the importance of certification when it required all institutions that receive Medicaid and Medicare funds provide assurances that support personnel are certified.

Twenty-one organizations offer nursing certification. The proliferation of credentialing has led to some duplication. A pediatric nurse practitioner, for example, can be certified by two different associations. In a few specialties, a master's degree is needed to seek certification. In some, a BSN is needed. In most, however, all that is needed to qualify for certification is a RN license and one to five years of relevant experience. Certification is normally valid for 2-6 years. In addition to some duplication, there is a continuing struggle within this care-giving industry between job categories of providers that have, in some cases, spilled over into the certification and licensure arena.

Sorting out which level of skill and expertise is needed to perform which jobs is often subject to debate within the affected workforce and this has spilled over into the licensure and certification arena. Within the nursing profession an example of such tension is the relationship between registered nurses and licensed practical nurses. The National Federation of LPNs (NFLPN) was founded by LPNs who wanted their own voice and their own leadership. The LPN is supervised by a doctor or an RN and cannot initiate intravenous drugs or administer blood or blood products. Training is received through a one-year program, although the credit hours required vary from school to school.

In the early 1980s, minimum competency standards included specific restrictions on the situations in which LPNs could practice without supervision. At that time, they also began finding it difficult to compete with RNs for a limited number of hospital nursing jobs. By 1985, officials of the ANA were seriously considering recommending "phasing out" the LPN. The thinking was that nurses needed more education to competently care for the new breed of patient, one arriving sicker and leaving sooner. Now, with the nursing shortage, the tide is changing in favor of the LPN.

Even if there is to be a substantial expansion of industry-driven accreditation, certification and assessment systems to improve the "market responsiveness" of the education and training systems, there will no doubt continue to be a set of trade-offs that must be dealt with regarding minimum requirements for certification eligibility. Again the nursing profession highlights the dilemma.

The requirement of the baccalaureate degree in nursing for generalists certification is a policy question which has undergone a somewhat extensive analysis over time within ANA. The Cabinet on Nursing Practice in its review of the question in 1985 moved to establish a policy, with consensus from the certification boards and councils, into place a moratorium on establishing the baccalaureate in nursing as a requirement for generalists certification until such times as 75 percent of the RN licensed population held a baccalaureate degree in nursing. Exceptions would be permitted when the nature of the practice area is acknowledged by broad consensus to require the minimum of baccalaureate preparation for practice in the specialty area.

ANA has generally held to the belief that the generalists areas of certification should focus primarily on the more broadly defined areas of practice, where there are identified a sizable number of nurses practicing within the area, and where there is a body of knowledge for the practice which can be clearly defined as sufficiently discrete from other areas of practice.

There is some push to require certification for employment in such areas as critical care, emergency care, and intravenous therapy. For the most part, employers do not require certification. Given the nursing shortage, it is unlikely that employers will require certification in the foreseeable future. The credential may help, however, in earning more money and also help an individual be promoted. Some hospitals, 13 percent of hospitals with ANA contracts, boost the pay of certified nurses. In Veterans Administration hospitals, certification can lead to an advancement of one to five salary levels. These are exceptions rather than the rule, however. (Wills:1992)

The reliance upon the requirement that individuals have a core body of knowledge prior to being eligible to sit for a certification or licensure exam appears to be a rational standard for many occupations. However, it appears that in some cases this requirement has been used as a tool to drive individuals back into the classroom -- sometimes to start all over again even though they have been practicing within the field. This apparently is due to the unwillingness of the specialized accreditation bodies to recognize course work in even a related field as well as refusing to recognize learning acquired through experience gained on the job. This study was not designed to address the merits or demerits of that approach, however such practices raise a number of questions about how to create more rational articulation strategies within major occupational areas.

Correspondence from Kenneth Edwards, Director, Technical Services IBEW, provides another part of the challenge of the skills standards initiative. "IBEW helps train for 750 occupational classifications that are covered by 14,000 to 15,000 collective bargaining agreements in seven or eight major industries. Some of these industries are under federal control, such as the Department of Energy, Federal Communications Commission, Department of Energy, Public Health Service, Nuclear Regulatory

Commission, Food and Drug Administration and the Mine Electric Safety Administration. Others carry state electrical licenses.

Approximately 200,000 of these members are employed in the electrical construction industry representing about 40% of the electrical labor force in the U.S. They have anywhere from 1200 to 1600 certified teachers and many members certified by various associations.

This story will be repeated again by others as the progress is made towards reaching a common understanding consensus regarding the development of a national, voluntary skills standards system.

Much remains to be accomplished.

CHAPTER IX

RECOMMENDATIONS AND CONCLUSIONS

A. INTRODUCTION

All of the research leads to a question: What does this imply for the further development of a voluntary skill standards system in the United States. The U.S. Department of Education asked the research group to explicitly answer six questions to help understand the scope of the roles for the federal government and the private sector in the development and implementation of skill standards to improve U.S. competitiveness in the global market. The six questions are:

1. What roles should industry and the federal government play in developing a nationwide system of skill standards?
2. What arrangements must the federal government adopt to encourage industry to become involved in the development and use of skill standards?
3. What are the best forms of assessment/testing to use in the skill standards systems?
4. How could a nationwide system of skill standards affect education programs at state and local levels concerning educational program improvement, curriculum modernization, and educational choice?
5. What testing guidelines should be recognized to insure against discrimination based on gender, ethnicity or disability status?
6. To what extent do the current apprenticeship and cooperative education systems in the U.S. provide a framework for setting skill standards?

Responses to the six questions and the recommendations which follow were derived from a synthesis of the experiences in the U.S., six other countries and a study of the Center for Policy Research of the National Governor's Association (NGA). The NGA project was a case study of 19 states that have undertaken state based skill standards programs.

This study was primarily a descriptive study. The study's focus, by contract design, was to provide information to the federal government about what exists. It was not a search to find the best practices based upon a set of evaluation questions, with the exception of the literature review of the current practices in job analysis and assessment. That review provided some suggestive guidance about best practices, but a wide range of unsettled issues remain in both of these areas.

It is important to understand the suggestions are rooted in assumptions about an "ideal" client-centered skill standards system where individuals and employers are considered the client. Our assumptions about an ideal system also reflect the key lessons learned from studying the experiences of other countries. The five key lessons from international experiences are:

- There must be a common framework that includes common language for the development of skill standards;
- Government must invest, at least developmental dollars, in assisting the private sector establish a comprehensive set of services;
- There must be true consultation processes that involves all of the stakeholders. Clarity and agreement will need to evolve regarding the roles of different levels of government, the types of support that will be needed for the education and training institutions, and the new forms of support that will be needed to assist learning in the workplace. This cannot be a top-down system;
- Substantial support must be provided to the development of the public sector, education, and training providers; and,
- The federal government's most critical roles are that of an enabler and of a consensus builder.

The Ideal System

The client centered criteria that have emerged from the combined sources has been condensed to the following criteria for the ideal client-centered skill standards system. Our specific assumptions are that the system would:

1. Not be bound by individual student/workers age and would be widely accessible to young people and adults;
2. Not be bound by type of institutions providing education or training and flexible in response to changing, and sometimes different, needs of individuals and localities through a variety of forms (e.g., education, full-time and part-time training);
3. Would be able to meet the needs of individuals regardless of type of education and training they are pursuing (e.g. initial preparation, continual, upgrading, or remedial);
4. Would allow career paths within and between industries;
5. Be explicit so that firms, education, training providers, and individuals know what the standards are and where information about them can be obtained;
6. Be a competency-based system;
7. Have a formal assessment and certification of an individual's skills documented by a third party;
8. Be a progressive system so that people can build upon blocks of competencies and adapt to technological and market changes, to improve their prospects or to explore their potential; and,
9. Have a common framework and use common language when describing skill levels across industries and occupations in order for both individuals and employers to easily understand the expectations and value of the use of the standards. The framework should progress from initial (entry) qualifications through several levels to mastery and/or specialization recognition.

These criteria provide the starting point for our responses to the Department of Education's specific questions.

QUESTION 1: WHAT ROLES SHOULD INDUSTRY AND THE FEDERAL GOVERNMENT PLAY IN DEVELOPING A NATIONWIDE SYSTEM OF SKILL STANDARDS?

Industry must be in the recognized lead role for the development of the standards and the federal government must help facilitate such development. It is essential to the success of any skill standards system that the employer community recognizes the value of these measures to their economic success and that they recognize and accept them as theirs.

The federal government has the critical function of being the enabler and promoter of consensus. This function cannot be overemphasized. Each of the other countries learned how essential it is to have quasi-independent organization(s) that are charged with the responsibility to bring together the various stakeholders. This has proven to be a substantial, but achievable, challenge in the other countries that are all smaller and less complex than our country. Our study shows that structures operating in the United Kingdom and Australia to be the most suitable for emulation in this country. In both instances the organizations created have a limited charter with a limited budget.

As of this writing a Clinton Administration proposed piece of legislation is being actively considered by the U.S. Congress to establish a National Skill Standards Board. The comments do not address the details of the legislation, instead focusing on suggested actions the proposed board, as well as, other federal government stakeholders should address to implement a nationwide skill standard system.

Some of the essential "first order" tasks, we believe, should be:

Establish a framework for generating valid and reliable skill standards, assessment and certification systems.

The National Board should develop the framework and requirements for nationally recognized skill standards. A common framework is essential in order to facilitate the standard setting process through the use of standardized language and format. The framework must consider what criteria will be accepted for recognition of valid and reliable standards. Review and updating schedules should be created. Standards should, when possible, be benchmarked to international standards such as those promulgated by the International Standards Organization. Criteria for recertification of an individual must be addressed.

The current U.S. Department of Labor and Education grantees form a natural core of organizations to help assist the Board in the development of this framework. Organizations that have successful experience in developing and maintaining third party standard setting and assessment programs should be consulted.

Establish common levels of qualifications.

The U.S. will need a progressively complex set of levels of knowledge and skill mastery required for individual career entry and progression into the highest levels of his/her chosen career path. Particular attention should be given to establishing criteria for recognition of occupations that cross industries. Within the broad-based levels, units and elements should be identified so that individuals will have the opportunity to be assessed for competencies within a single level and accumulate credit over time and in different settings.

Establish procedures for benchmarking to international standards and for upgrading and maintaining the skill standards continuously.

Skill standards will only lead to higher skills and assist in the improvement of the economic position of firms and individuals if they are benchmarked against the highest international standards. Skill standards must never be assumed to be static fixtures. There should be a planned process for continual upgrading in response to technological change.

Establish criteria and recognition procedures for organizations that develop standards.

No one current industry or occupational classification system is fully satisfactory for describing either an industry or an occupation. However, the Board should establish a set of criteria that it can use to examine an industry group that voluntarily comes together to promote standards within an industry. The criteria should include assurances that any such organization recognized represents all aspects of the industry, that geographic representation exists and membership includes incumbent workers.

Particular attention should be given to establishing criteria for the recognition of broad based occupations that cross sectors. Pooled representation from several industry groupings may be the most feasible approach to jointly develop common standards, where appropriate. Obviously there are several occupations, such as secretarial services, that permeate all industrial sectors. These broad, cross-cutting occupations, need to be identified and then representations from all of the industries involved in agreeing upon the general skills as well as the specialist skills (e.g.legal, medical, financial services) could, if necessary develop their own specialized standards.

Once recognized or "chartered" to develop standards the industry group should develop standards that meet validity and reliability criteria. The skill standards should be submitted to the Board for the purposes of being "accredited" as standards recognized by the Board.

When developing the criteria the Board will need to address how to assure there will be a sense of ownership, on the part of employers, in the organization(s) that are selected for the standard setting process. Without a sense of ownership on the part of employers, within each industry, it will be difficult to get employers to share in the cost of the development and maintenance of the skill standard setting and certification efforts.

Establish criteria and recognition procedures for organizations which design and award the certificates and insure the quality control over the assessments system.

This recommendation is predicated on two assumptions: (a) a third party assessment process is a component of the skill standards effort, (b) several different organizations can and will be involved in such assessments. However, there should be agreement on the best ways to describe and assess performance levels for the complex skills required in the modern workplace.

The organizations which establish the standards could be in the position to conduct the third party assessments or, as is often the case in several trade association-sponsored certification programs, another organization conducts the assessment for the program. Several different permutations are possible, but we believe the National Board will need to address criteria for the recognition of third party assessment providers.

A system of easily accessible, cost effective assessment centers that are staffed with trained proctors should be created throughout the country. A variety of trade and professional associations have substantial experience in this area that could benefit the National Board. It is also possible to use publicly funded labor exchange offices and/or education and training organizations facilities and staff as is done in Japan. The state's adult education programs in this country have a working agreement with the American Council of Education to administer the GED tests that may provide insights in this area.

Establish procedures that ensure the security of individual records of persons that have been awarded recognition of having achieved the qualification(s). Also develop a system that will ensure easy access to the standards themselves.

In order to protect the individual and promote utilization of the standards we have identified these issues as two early tasks the proposed National Board should address.

The report of findings from assessments needs to be generated in a form that is easily recognized and is portable from one place to another across the country.

Any type of certification program must adhere to civil rights guidelines and standards established by case law. This means that documentation for all types of assessment must be generated and maintained long-term. Early and thoughtful consideration on how to develop and maintain national registries is needed.

It seems logical that at the same time the maintenance of individual records is being considered that attention should be given to ensuring there will be easy and affordable access to the standards themselves. The United Kingdom has chosen to vest the functions of managing both of these information systems within the charter of the National Board. This may not be the best approach for the U.S. but some system should exist.

Establish procedures for disseminating skill standards to employers, education and training providers, assessment systems, and individuals.

Voluntary skill standards have meaning when they are widely used. Considerable attention must be given to promoting use of the standards. Such promotion should be rooted in fact and detail the benefits to individuals, employers and education and training providers.

During the early stages of the effort developing trust is essential. The National Board should be a key player in developing and assuring there is an open and clearly understood process for consultations among the stakeholders. Employers, unions, units of government, educators and training providers must have formal means by which their concerns are heard. Membership on the Board from the various stakeholder communities cannot be the only way to be heard. Procedures adopted by the Board should include links to other formal commentary and review processes already in place by the federal government.

The establishment of a Board is but one part of any skill standards systems. The federal government will need to support the effort in multiple ways. Identifying how all the key parts of the federal government can promote the use of the skill standards initiative is critical. If history can be used as a guide, this will not be easy, even within one department -- let alone across several departments. Local and state governments as well as industry and unions will be looking for evidence that the federal government is ready to act as a leader.

There will need to be substantial attention given to dissemination linkages with and through state governments. One of the primary users of the skill standards will, of course, be education institutions, training organizations, career counselors and employment placement staffs. Youth service organizations should have easy access to the skill standards. States are the major regulators of occupations (licensing and certification) and these regulators also need the information.

Several options are available to assure wide dissemination of the skill standards to these various constituency blocks and through them to individual consumers. Consideration could be given to having a Governor designate a dissemination agent which has the capacity to reach into these various communities of interest. Dissemination of information in formats useful for different consumers will not be a free commodity and some "costing out" should be undertaken.

Reaching into the employer and union communities will be equally essential. General business organizations (with a special emphasis placed on those reaching small business) as well as industry-specific associations should all be used as disseminators of information about the value of skill standards.

Develop a shared development and maintenance funding strategy.

The proposed Board, in consultation with the "stakeholders", and most importantly federal offices and agencies, should develop a shared development and maintenance funding strategy.

The development of comprehensive and nationally applicable skill standards will require support from both the pubic and private sectors. This support can take many forms but without it nationwide skill standards will not exist.

Most of the private sector support for the development and maintenance of skill standards/credentialing programs comes from "parent organizations" that are responding to some form of economic imperative, or as an act to prevent the impositions of federal regulation over the industry.

Individuals are willing to spend money for a third party assessment/credential when they consider it to be in their economic self-interest. The proposed voluntary skill standard system is not envisioned as being driven by these private motives.

The envisioned system incorporates additional "public good" imperatives. This will require giving attention to sorting out who should pay for what (employers, individuals, and government.) It is not presumed that funding from the proposed Board can or should be the only source of government funds needed to promulgate the effort nor is it assumed the private sector can or should pick up the total costs. For example, federal vocational education and job training funds can be used to help share in the costs.

QUESTION 2: WHAT ARRANGEMENTS MUST THE FEDERAL GOVERNMENT ADOPT TO ENCOURAGE INDUSTRY TO BECOME INVOLVED IN THE DEVELOPMENT AND USE OF SKILL STANDARDS?

Note: For purposes of this discussion the term industry is meant to include employee organizations as well as employers.

Millions of volunteer hours are donated each year in the development of validated skill standards. We see that from both the education and industry-driven skill standards programs across the country. It is hard to imagine that it will be difficult to garner industry involvement in the development of the standards. Financial support will be needed to encourage the development of comprehensive skill standards that will assist the novice as well as the specialist/master. Ensuring a comprehensive system, is we believe, one of the key reasons for government action. This is a "big gap" so to speak.

Many of the private credentialing programs focus "in the middle" of the career path ignoring the entry as well as the mastery levels. A common progressive framework and common nomenclature is needed to connect career pathways.

Gaining industry participation in the development of the standards will not be a substantial problem. The public role, of helping to establish a common framework and common nomenclature, we believe will be accepted by industry because thy they are accustomed to the use of standards.

Demonstrate the value of skill standards to encourage use by employers.

It is to the second part of this question the federal government asked us to address that our study suggests substantial attention is required. Use within industry may prove to be problematic. There needs to be an aggressive "show them and help them" strategy to encourage industry to use the skill standards systems.

Employers will need to be given substantial evidence that the use of skill standards will increase productivity within the workplace. There is scattered evidence in the United States that the use of skill standards does increase productivity. Evidence drawn from trade and professional associations should be compiled and disseminated widely throughout the business community through the Departments of Labor and Commerce and by those responsible for promoting the Malcolm Baldrige Quality Award.

Develop support materials to focus use of skill standards in the workplace.

In addition to "show them" strategies a great deal of "help them" work has to be considered with a strong focus on the front line supervisors and managers.

There is substantial evidence that it is costly, complex, and often beyond the means of most employers to provide the appropriate focus on workplace-based use of standards. This includes assessing real skills and knowledge of workers, monitoring progress, developing and utilizing competency based training materials, organizing rotational learning opportunities and more. Strong consideration should be given to providing support, once the standards are established, to organizations that represent a significant portion of an occupation or industry. This support should include the development of workplace-friendly materials.

Efforts should include development of easy to use manuals that would help assess, in a non-threatening fashion, current workers skills based on the standards. Guides that suggest ways to organize the workplace to help make maximum use of those employees with documented the skills and training materials for work-site or off-site that adhere to standardized language format can also be useful. Training materials should be developed with the end user in mind using cost-effective, computer assisted instruction whenever possible.

As third party assessment programs evolve, materials should be developed that affirm work-based skill development.

Provide leadership and support to help employers comply with civil rights laws.

A major barrier to implementing standards by employers is the fear of civil rights violations. The federal government has been hesitant to provide technical support to help resolve such fears. The National Board, and other parts of the federal government, should help support the development of technical and training materials that will advance the cause of equity, access and quality standards simultaneously.

It is not possible to estimate the cost of the development of such materials but the price tag will not be small. Sharing costs between government and industry based networks should be considered in the development of technical assistance materials.

The federal government has not been a major actor in the development of work-based learning materials, but it is possible to use several sources of funds to help supplement the cost. For example, funds from Work-based Literacy Programs, Adult Education, Bilingual Education, the Job Training Partnership Act, the Carl Perkins Act, the Small Business Assistance programs, and the programs that support the Advanced Technology Centers could all be applicable. This recommendation is feasible (without violating the discreet purposes of each authorizing legislation) because one of the great advantages of common standards is the it allows a wide range of programs and providers to "plug them into" their specific mission and purpose. This would allow separate federal initiatives meet their individual program goals.

The federal government could enlist the help of state customized training programs and the proposed state Human Resource Councils to promote the use of standards in state funded training programs.

Promote the use of skill standards through incentives.

Other incentives include the shifting of the treatment of training in the tax code from one of a current expense to an investment or promoting the creation of a grant/levy incentive plan based on a portion of payroll expenses. Clearly, these recommendations are not based on the finding of the study of current efforts in the use of skill standards in the U.S. but again, are drawn from the observations of other countries. Almost all have sorted out different avenues to promote the sharing of the cost of investing in human resource development between the public and private sectors, with the use of payroll taxes being one of the more common approaches.

QUESTION 3: WHAT ARE THE BEST FORMS OF ASSESSMENT/TESTING TO USE IN SKILL STANDARDS SYSTEMS?

There is no silver-bullet answer to this question. No one form of assessment or testing was identified as being superior either in the literature search or in the in-depth review of selected industry-based skill driven certification programs.

It is important to note the criticality of first performing a valid and extensive job analysis for the creation of standards. Only through a systematically performed job analysis can one insure that the standards and aspects of the certification program accurately represent the needs of the industry and the work of the job incumbent. Secondly, provisions of the Civil Rights Act, the National Labor Relations Act, and other appropriate law associated with assessment and job analysis must be followed.

It is clear there is a great deal of interest and experimentation occurring in the development of performance assessment instruments. While there was no substantial evidence that paper and pencil tests should be totally dismissed there is also no evidence they should be the only instruments used.

Currently, few certification programs rely solely upon written tests. Many programs found the expense plus assuring competency of the judges necessary to administer performance based assessments rendered those assessments unfeasible. Many large scale certification programs have resorted to accepting time spent in the workplace and/or recognition of some education as substitutes for specific skills performance and as supplements to paper and pencil tests. Some require work samples that are judged by a panel of peers. Computerized technologies may permit state-of-the-art simulation testing in some occupations (assuming costs are reasonable).

Establish consultations with experts to study and improve assessments processes.

Materials collected from trade and professional associations for this study could be used to identify organizations using a range of assessment instruments and criteria to award recognition. Based upon such a review, a series of consultations should occur with a wide range of experienced individuals to help inform decisions about what are the most feasible and appropriate next steps that would help to establish more valid assessment techniques. The Board would also be well served as it develops an assessment research agenda if it tapped the work of other countries, particularly the United Kingdom that has invested a substantial amount of effort in this area. Representatives of civil rights groups, employers, and unions all need to be involved in the consultations and the development of the research agenda.Such consultations could help inform the research agenda of the proposed National Skill Standards Board.

Bring together federal agencies to develop a linked assessment development strategy.

Promotion of a voluntary skill standards systems is a part of the response to the National Education Goals, specifically, Goal 5. Consultations need to occur with the other offices and agencies within the federal government that have responsibility for the development and implementation of the various assessment efforts embedded in that goal. Specifically, the work of the National Center on Education Statistics, that has been responsible for developing the materials to assess college graduates ability to think critically, communicate effectively and solve problems should be studied. The work of NCES clearly shows the potential to link the research and development of new assessment methods.

A particular focus of this joint effort should be to ensure that any federal government initiatives promoting school-to-work transition will devote substantial attention to improving independent assessments of students based upon the skill standards recognized by the National Skill Standards Board.

As noted in the "ideal" skill standards system the preference would be to develop mechanism(s) that provide for independent third party assessments of an individual. Additionally, the third party assessments would be widely recognized and portable across state lines and within the education community. Substantial work needs to be done in this area. An aggressive R&D effort should be mounted to test out various forms of assessments (e.g. performance, computer assisted simulations, work-based assessments) and various approaches to establishing links between education based assessments and industry validated assessments.

One final observation, the government, if it wants to set an example, may need to rethink current legislative exclusionary clauses that allow government exemption from the same processes that the private sector must follow when creating and using assessment and certification examinations.

QUESTION 4: HOW COULD A NATIONWIDE SYSTEM OF SKILL STANDARDS AFFECT EDUCATION PROGRAMS AT STATE AND LOCAL LEVELS CONCERNING EDUCATIONAL PROGRAM IMPROVEMENT, CURRICULUM MODERNIZATION, AND EDUCATIONAL CHOICE?

If care is taken to involve all of the stakeholders and if the necessary support systems are developed, the impact on the nationwide system will be profound.

The "Ideal System" is predicated upon an assumption that all education and training providers would use competency based curriculum and instructional materials derived from the skill standards. This, we believe, supports the concept of choice in the most pragmatic and useful way possible.

There will need to be a clearly developed consensus regarding the appropriate roles and responsibilities of education and training providers in the development and implementation of a skill standards system.

This study, we believe, highlights the fact that the most important functions to be completed by the education and training institutions are the delivery of education and training services, not the development of the standards themselves. Without strengthening the capacity of the education and training system the skill standards "system" will flounder.

Develop an array of capacity building networks to assist education and training providers.

Another "first order" of work for the proposed Board as well as key agencies of the federal government is to begin work early on developing a consensus strategy that will, at a minimum, address the following topics for the total education and training community and the relevant policy makers responsible for those institutions:

- Develop an information dissemination strategy to explain the intent and potential;
- Develop and assist the implementation of technical assistance to help promulgate the utilization of the standards;
- Develop and assist organizations that would have responsibility for being the "linking institutions" between the standard setting and assessment bodies and the education and training provider community;
- Address the issue of staff development, and
- Develop improved quality assurance mechanisms.

Develop an aggressive information dissemination agenda.

At this point in the history of skill standards, one of the tasks is to help people understand what is meant by skill standards and how they can help improve the education and skills preparation of individuals. While the proposed Board should be involved in this effort, in no way should this be a "solo" effort. Several parts of the U.S. Departments of Education and Labor need to be involved.

Teachers, counselors, principals, superintendents, local school board members, community college instructors, state departmental staffs responsible for approving programs within community colleges or developing curriculum frameworks for the public schools and, chief state school officers will need to understand the implications of skill standards. So do representatives of employment and training organizations such as PIC's and community based organizations. For many of these audiences, tapping into their national peer networks for purposes of sharing information should be a beginning step. There will be a need to ensure that each of these different audiences are receiving the same core information regarding the skill standards in order to reduce confusion and/or promotion of "turf fights" that have all too often characterized the relationships between the various parts of the education system and among education and training providers.

Invest in technical assistance and support.

Consortium-type efforts involving one or more national networks may be a cost-effective approach to develop materials related to the use of the standards. For example, it may be desirable to develop a project that would include representatives of state departments of education, community colleges and vocational technical education to provide technical assistance to their member institutions regarding how to develop articulation agreements between secondary and postsecondary institutions. They could use the identified skill standards in broad occupational areas and build upon the Tech-Prep tiered approach to developing curriculum. Consortium networks, such as the recently established Alliance for Curriculum Reform, representing 26 national subject-matter professional organizations and other education groups involved in curriculum development based upon national standards could be tapped to help think through an infusion strategy.

A lesson could be taken from Japan regarding the use of association networks in the skill standards arena. One of the primary activities of the Vocational School Principals Association is to develop, in concert with industry research teams, curriculum and related tests that are then sold to the schools throughout the nation. Through this approach national curriculum is constantly updated and criterion-referenced tests are available, and trusted, by all the relevant stakeholders.

These suggestions are illustrative of possible approaches that could be taken to help organizations and institutions understand the value and utility of skill standards. Thinking broadly in terms of reaching out, not through the all too typical narrow silos of categorical funding is essential.

Adding focus and emphasis to currently existing research and technical assistance efforts should be aggressively pursued. A careful review of how to infuse skill standards related activities into existing efforts would seem appropriate, across the full spectrum of federally supported research and development activities (e.g. OERI funded research centers and regional laboratories, OVAE's research centers for vocational education and literacy, the U.S. Department of Commerce support for advanced technology centers, etc..) With some common strategic planning several of these on-going efforts could contribute value-added support to the effort.

Develop linking institutions.

These suggestions could prove useful but still insufficient to ensure the goal of improving education and training systems primarily due to the temporary nature of the suggested tasks and the presumption that the funding would come from short term federal government grants or contract funds. Institutions that are sustainable, and jointly "owned", we believe will be necessary. For lack of a better descriptor, we have called these, linking institutions. There are several approaches that could be considered for the development of such institutions. For example, organizations could be established around major occupational clusters or geographic regions. The essential point is that industry representatives, state governments, and especially the representatives of secondary and post-secondary institutions must come together and agree upon a common agenda that will continuously translate skill standards into curriculum, update curriculum, instructional materials, and make it widely available to all types of education and training institutions.

Substantial attention must be given to developing the most cost-effective means to ensure that students have access to the appropriate instructional materials. Many individual schools have found that fiscal constraints do not permit them to provide the necessary up-to-date equipment needed for specific occupational training. Some creative thinking is needed in this arena. It may be desirable to think about creating "teaching factories" where the government and the private sector enter into agreements for the purpose of teaching students, or more aggressively using the apprenticeship model for education. Again, the suggestions are made, not to promote a single prescription but to counsel that new and different creative solutions will be essential.

One must be impressed, we believe, with the experience of voluntary multi-state collaborative efforts, such as V-Tecs. It shows the value --- indeed the necessity --- of having organizations that are translators of skill standards into curriculum. It has shown the value of sharing development costs across states.

Develop staff capacity throughout the education and training networks.

This issue was consistently identified as a concern. Instructors from all types of institutions need to have a deep understanding of what is happening inside workplaces. Finding qualified instructors will continue to be one of the most important barriers to ensuring quality education and training.

The study did not generate possible solutions within this arena but simply highlighted how essential the issue is in almost all education and training situations. Again, it would be inappropriate for the proposed Skill Standards Board to be expected to solve this problem. Attention must be given to this issue by several parts of the U.S.Department of Education, the states and several different organizations. An observation may be helpful. There has been, over time, a substantial amount of federal funds used to support staff development but much of the support has been piecemeal in nature. It would be best to develop a holistic strategy, in concert with the states and key organizations representing teachers and other personnel.

Develop improved quality assurance mechanisms for education and training programs.

Other countries not only set competency-based outcome standards but also quality standards for programs, regardless of the institutional setting. Germany, for example certifies learning places that are authorized to receive some type of funding or recognition in the system.

The accreditation community and state governments need to be substantially engaged in consultations that focus on how to develop improved quality assurance processes for recognizing programs of quality.

Another component of improving quality assurance mechanisms can be found within performance management systems promulgated by the federal and state governments. Both levels of government should commit to incorporating skill standards within all of their performance management systems for workforce development programs.

QUESTION 5: WHAT TESTING GUIDELINES SHOULD BE RECOGNIZED TO INSURE AGAINST DISCRIMINATION BASED ON GENDER, ETHNICITY OR DISABILITY STATUS?

Build upon the guidelines that have already been established by private, voluntary national standard setting quality assurance organizations.

There are two organizations that have developed strong and well researched testing guidelines for use in standard setting and assessment programs; the American National Standards Institute (ANSI) is the U.S. member body of the International Organization for Standards (ISO) and the National Commission for Certifying Agencies (NCCA). The guidelines vary only in small degrees, probably reflecting the history and traditions of the organizations themselves. Both organizations' guidelines, if followed, would assist any testing efforts to ensure against discrimination based on gender, ethnicity or disability status.

A substantial amount of attention needs to be given to how the published rules are developed, how many languages the tests will be made available in, whether only citizens or any U.S.resident can take the tests, who pays for the assessment, and much more. But as noted, there is substantial experience that can be used to build satisfactory guidelines.

QUESTION 6: TO WHAT EXTENT DO THE CURRENT APPRENTICESHIP AND COOPERATIVE EDUCATION SYSTEMS IN THE U.S. PROVIDE A FRAMEWORK FOR SETTING SKILL STANDARDS?

Neither the registered apprenticeship system nor the cooperative education system, in and of themselves represent a framework for setting and implementing skill standards. However, both systems provide lessons for the new system from their implementation history, and both may be regarded as potential points of articulation between systems currently administered by the Departments of Labor and Education and the new skill standards system.

The vocational-technical education system, within which many of the co-op programs are embedded, provides a larger context within which to discuss the development of the framework for setting skill standards.

The Registered Apprenticeship Programs

In general terms, the framework of registered apprenticeship programs has four elements in common with the envisioned framework of the new skill standards system:

It is a federal-state system;
It is a management-labor system;
It is an industry-education system; and,
It is a public-private system.

Apprenticeship is a federal-state system. Since not all states have State Apprenticeship Councils (SACs), the state partnership with the federal Bureau of Apprenticeship and Training (BAT) is incomplete. Further, state autonomy has resulted in some inconsistency across states. Finally, the structure of the system does not assure portability across jurisdictions of credentials issued under this system.

With respect to management-labor, apprenticeship programs require participation by employers in all sponsorship arrangements and, where the workforce is organized for collective bargaining, also require participation by labor (or an explicit waiver). Apprenticeship does not involve worker representation if the workforce is not organized. A majority of registered apprentices are enrolled in joint programs, and the joint programs include the largest programs and those generally regarded as highest in quality. Therefore, registered apprenticeship has a de facto association in the minds of many with organized labor.

Apprenticeship involves an industry-education partnership because registered programs must provide related instruction. The providers include public secondary, public postsecondary and private institutions. The instructional component is distinctly secondary to the experiential component and not always well-articulated with it.

With respect to the internal structures and procedures of registered apprenticeship programs, including their quality control provisions, variability is the rule rather than the exception. Traditionally, registered programs have been time based but competency-based programs are gaining in frequency. All registered programs emphasize informal observation of skills mastered and demonstrated on the job, rotation through various aspects of the trade, and progressive advancement in wages. Less standard is the degree to which skill requirements are updated and validated, the types of assessment employed (e.g., informal observation, formal written, formal performance), and the training and certification requirements of related instruction instructors.

In the area of incentives and disincentives, the experience of registered apprenticeship offers some interesting lessons. With respect to incentives, the Davis-Bacon Act provides substantial financial incentives for registered apprenticeship in the construction trade and, in fact, the majority of registered apprentices are in construction occupations. With respect to disincentives, two factors appear to have been operative, particularly outside the construction industry. First, the equal opportunity provisions and procedures of registered apprenticeship programs have caused some employers to shy away from volunteering for a level of government oversight that they would not otherwise be subject to. Similarly, the de facto association between apprenticeship and organized labor has caused some determinedly non-union employers to fear that the adoption of apprenticeship would be a stepping-stone toward an organized workforce.

With respect to the public-private character of apprenticeship, it involves public sector "accreditation" of private industry entities that are training providers. It is within this area that consideration could be given by the National Board to establish specific criteria for the recognition of a pubic-private apprenticeship program that accommodates the strengths of the apprenticeship system but helps correct some of the identified weaknesses (eg. does not cover he entire career, assurance of continual updating of standards, improved assessment processes.)

Australia, found that it was useful to establish criteria to recognize an individual company's standards when the company controlled a significant segment of an industry. There is no reason this country's system cannot be sufficiently flexible to accommodate the unique features of the apprenticeship programs.

Canada offers an excellent example of how to create portable and easily recognized qualifications based upon the traditional form of apprenticeship training. The processes used to develop their Red Seal exams offer a tested approach for qualifying individuals within this highly decentralized, privately sponsored but publicly supported form of training.

The federal Bureau of Apprenticeship Training's (BAT) regulations predominately focus on process and program structure issues and the only major "quality assurance" standard contained in those regulations relates to wage rates. The standards expressed in the registration document and included in the individual apprenticeship agreements that serve as contracts for employment are most often time based, not competency based. Most of the attention is focused on the initial preparation of workers, and little attention is given to the continual upgrading of the workforce and few stress the entire career path. Furthermore, the process standards do not require continual updating and validation of the skill standards, nor do they promote the use of the best practices in assessment. The emphasis placed on assuring quality instruction by many of the national BAT programs appears to be of vital importance in the conduct of a quality apprenticeship program, however, the BAT regulations are silent on the issue of instructor qualifications.

Individual BAT-recognized apprenticeship programs do provide excellent examples of how to link industry skill requirements to related instruction and then certify individuals based on a nationally recognized third party assessment set of instruments that have been constructed based on the criteria embedded in nationally available training materials. The study highlights three such examples, the Laborers Union's/AGC new assessment certification initiative, the International Masonry Institute's initiative, and the National Joint Apprenticeship and Training Committee of the International Brotherhood of Electrical Workers and the National Electrical Contractors Association. There are other apprenticeship programs of high quality throughout the country and there is little doubt that the essential features of the apprenticeship model for learning in the classroom as well as in the workplace represents, if not the best approach for assuring a trained workforce, is close to the top as a training model.

In all, registered apprenticeship offers some interesting parallels for consideration by those involved in developing the new skill standards system. As identified above, there are a number of general similarities, as well as some key differences. Two limitations of registered apprenticeship appear to deserve particular consideration. First, registered apprenticeship is characterized by considerable variability and fragmentation, some of which may be necessary and desirable in a diverse and far-flung economy such as ours, and some of which may be excessive and counter-productive for a national system. Second, registered apprenticeship has achieved only very limited implementation, despite obvious virtues, and despite a variety of efforts to promote more widespread implementation. The factors associated with these two limitations deserve consideration by the National Skill Standards Board so that the positive aspects can be maximized and the negative aspects minimized. Their involvement in the development of the national voluntary skill standards initiative can only enhance the total effort and improve the Apprenticeship programs simultaneously.

Cooperative Education Programs (Co-Op)

Although many cooperative education programs utilize skill standards in their agreements between business, education and student, it is not one of the drivers in the standards development process. The cooperative education program is frequently used as the capstone to workforce related training, as a means for secondary or postsecondary students to practice skills learned in the classroom and in an internship laboratory setting. In other words, Co-Op programs are users of skill standards that have been incorporated into course syllabi and training agreements to determine the skills which will be taught or learned in the classroom and which at the job site.

Evidence clearly shows that cooperative education or internships are considered integral parts of learning experiences. Several of the industry and professional associations who submitted materials regarding their involvement in specialized accreditation programs noted requirements for some form of applied learning off campus. The Title VIII of the Higher Education Act and the Carl D. Perkins Act both support campus based co-op programs in several forms. Certain occupations, such as engineering and the allied health professions (which typically use the term internship) have a long and rich history in such programs. However, these programs may or may not be rooted in national, state or local skill standards systems.

The division of what is learned in the classroom and on the job, may require additional research as the skill standards effort unfolds and improved curricula and instructional methods are developed. Cooperative education programs should be well positioned to assist in such research and development efforts.

The Vocational-Technical Education System

The "parent" authorizing legislation for the co-op education programs, particularly for those at the secondary level, has traditionally been the vocational-technical legislation. It is important to discuss how this system can support the development of a national skill standards system simply because it will have a broader impact than that of the co-op education program.

It is probably a safe assumption that a substantial burden of implementing the educational components of the occupational preparation for the workforce will fall upon the secondary and postsecondary institutions that are as a whole called the voc-ed system. Clearly, the work within the states, to date, to establish skill standards and related competency based curriculum for occupationally related education has been accomplished primarily through the voc-ed structure. Also the challenge to improve the articulation between secondary and postsecondary education institutions has been spurred on by the establishment of the Technical-Preparation program within the Perkins II legislation. The effort to increase the integration of academic and vocation related curriculum is also being stimulated by the Perkins II legislation.

The vocational technical education system's work with over 700 employer committees to establish skill standards for entry and "journeyman" levels of skills mastery makes this system a leader in this emerging field. While this provides an important base, for the most part, the number of occupations for which skill standards have been or are being developed has been driven more by the types of programs than by the prevalence of different occupations or the changing nature of work, though presumably this is reflected in the content of the programs offered. There are few nationally validated and commonly used (across all states) skill standards within the vocational education system and there is little evidence of consistency in the level of education and occupational specialization for which standards are being set. Nor are there yet many examples of portable "credentials" that accompany nationally industry validated standards.

The study documented that the primary use of occupational skill standards has been to develop task lists as the basic units of curriculum, instruction and evaluation criteria for entry to sometimes "journeyman" levels. The study indicates that employers have been willing to work with the state officials on all three of these tasks. However, it also reveals the additional opportunities need to be pursued.

Have states collectively examine the current base of occupational skill standards.

Collective work among all of the states, in concert with the National Skill Standards Board, could be undertaken to look across all major occupational areas for which standards have already been developed to ascertain where it would be possible to (a) identify common standards that could be used within a national framework using common language and competencies, and (b) assess where it would be possible to improve the balance between supply of identified occupational competencies (e.g. there were 120 identified for agriculture and 62 for health). While numbers and lists do not tell the whole story they are an indicator of a level of effort that may not mesh with the highest needs of the labor market.

Additionally, education institutions, more so than training institutions, have the responsibility to provide students with the theory and knowledge that will prepare students for the future. Therefore, while the skill standards provide an essential baseline of competencies the "related instruction" needs to help students be prepared for the evolving workplace. This is one of the critical reasons the "SCANS Skills" have high utility for the education community. They can be used to help develop the framework of a continuum of standards that will be needed in the future.

Support an R&D effort to identify and measure the competencies that can best be learned within the workplace versus the classroom.

Much of the work that has been done to date regarding skill standards within the education community has been focused on eliciting the support of industry to help identify the competencies required in the workplace that can be translated into curriculum for the classroom. However, more attention is needed to sort out which types of competencies are best learned at the work-site, under what conditions, versus what competencies are best learned in a classroom or a laboratory. This research should be linked to testing new forms of evaluations and assessments that generates a tighter link between the employers and classroom instructors -- yet is linked to testing and developing "portable credentials" .

Improve the pipeline for assuring high quality professional capacity

Work among the institutions of higher learning, the vocational education research community, and the state policy makers is needed to help the vocational education community to continue to improve and expand competency-based curriculum and instructional techniques. Work is also needed to develop improved student assessment methods that could eventually be incorporated into a commonly recognized portable credentialing effort. There are most assuredly, a multitude of other issues regarding improving the pipeline of professionals emerging from the institutions of higher education but these specific suggestions focus on the implications emanating from a skill standards system. The Office of Vocational and Adult Education is well positioned to take the lead to encourage such efforts.

Mesh the use of Skill Standards with the Development of Performance Standards for Vocational Education

The Perkins II legislation requirement that states develop performance standards for secondary and post-secondary programs should, overtime, include the use of skill standards. In order for this integration to be achieved it will be necessary for the key consultants who are assisting the federal government and the states in development of performance standards to become knowledgeable and involved in the emerging skill standards initiative.

A portion of this work should address how both the performance standards and the skill standards can be used to assist state and local operators use both forms of standards to continuously improve both program quality and linkages with the employing community.

ADDITIONAL OBSERVATIONS

There are additional observations that were not explicitly required to be addressed in the contract, but emerged in the study that merit consideration by the federal government.

Use the common language of standards in classification systems.

It will be important to pay attention to the issue of using common language across several standard information systems such as the classification of occupations and industries, (i.e.the Dictionary of Occupational Titles, the Standard Occupational Classifications and the Standard Industrial Classification, etc.)

Canada has found several useful ways to help facilitate the occupational counseling and labor exchange services by coordinating the development of common classification systems across several programmatic areas.

Inform the general public and support enhanced counseling services.

A substantial effort must be made to help individual students and their parents learn about the skill standards and their implications. Individual counselors responsible for helping students in a wide variety of institutions should have a deep understanding of the career and educational options that will be derived from meeting the standards.

The Job Service and career guidance and counseling staffs housed in schools and training institutions should have easy access to information about the standards as well as which local organizations provide what type of skill standards related training.

All career information systems should incorporate information on skill standards and credentials.

CONCLUSIONS

The effort will very much be a part of a reinventing government agenda. It will require not just reaching a consensus on the how to develop a common framework within which to organize and develop skill standards but the development of the capacity within both the public and private sectors to support individuals' education and training to those standards.

The IEL team became convinced that the development of the standards, while time-consuming, will prove to be one of the easier tasks to fulfill. There is a rich body of experience in this country about the identification of skill requirements and the development of validated common standards that have been aided by civil rights laws and regulations geared towards assuring non-discrimination. The critical next step is to bring together the skill standards and credentials resulting from these experiences under a common framework that results in nationally recognized standards and portable credentials.

A large challenge, the team believes, will be the development of the capacity to exploit the standards to their fullest potential within organizations and governments. This will require developing consensus and common action plans among various parts of the federal government as well as within industry networks and sub-national units of governments. This effort cannot be accomplished only by the establishment of the National Skill Standards Board, but will require concerted and coordinated action on the part of several federal Departments. This will require new approaches to interagency collaboration.

The reality is that all of the processes, including the development of a common framework within which the skill standards are established, within and across industries, will be a politically negotiated process among the various stakeholders and will take several years to develop. This means that the structures and systems that will be established need to be sufficiently flexible so that continuous refinements and improvements will be encouraged.

It is essential that a wide array of capacity building efforts be established that focus on the needs of education and training organizations if the skill standards initiative is to become a part of the human resource development system in the United States. Other countries, including those that have had traditionally strong federal government presence in setting education policy, have found it necessary to develop special support systems for the education and training providers to establish the appropriate linkages with the industries within this arena. The non-directive role that both the federal (and arguably the state governments) have over education and training institutions in this country makes it essential that substantial attention and careful thought be given to developing sustainable institutional arrangements. Agreement will need to be reached among the levels of governments responsible for supporting education and training systems regarding the best approaches to be pursued.

A quiet and deliberate approach that is also aggressive will be required to generate the mutual trust among the private and public sectors, among the potential private sector partners, among the different levels of government, among different types of education and training institutions, between different agencies within the same federal departments and across federal departments. The IEL team came to believe the value of establishing skill standards was worth the challenge.

BIBLIOGRAPHY

Adams, R. E.. (1975). DACUM: Approaches to Curriculum Learning and Evaluation in Occupational Training. Ottawa, Canada.

American Psychological Association. (1975). Principles for the Validation and the Use of Personnel Selection Procedures. Washington, DC: Author.

American Psychological Association. (1985). Standards For Educational and Psychological Tests. Washington, DC: Author.

Asher, J.J., & Scarrino, J.A. (1974). Realistic Work Sample Tests: A Review. Personnel Psychology, Vol 27, (pp. 519-523).

Association on Higher Education and Disability. (1993). Testing Accommodations For Persons with Disabilities: A Guide for Licensure, Certificaiton, and Credentialing. Columbus, OH: Author.

Berk, R.A. (1986-87). Performance Assessment. Baltimore, MD: Johns Hopkins University Press.

Bernadin, H.J., & Kane, J. (1980). A Second Look at Behavorial Observation Scales. Personnel Psychology, Vol. 32, (pp. 809-814).

Bernadin, H.J. (1977). Behavorial Expectations Scales versus Summated Scales: A Fairer Comparison. Journal of Applied Psychology, Vol. 62, (pp. 422-428).

Border, Barbara A. (1992). NAVTEF Study of Occupational Skills and Competency Standards Jointly Developed by Business, Industry, and Education. Washington, DC: National Association of Vocational-Technical Education Foundation.

Buckley, John. (1993). U. S. Army Conversion Menu and Competency Systems. U. S. Army, VA.

Campbell, C.P., & Hatcher, J.G. (1989). Testing That is Performance-Based and Criterion-Referenced. Performance and Instruction, (pp. 1-9).

Cornelius, E.T.,III & Gael, S. (Ed.). (1988). Practical Findings from Job Analysis Research. The Job Analysis Handbook for Business, Industry and Government.

Crystal, R.E. (1974). USAF Occupational Analysis Project. San Antonio, TX: Air Force Human Relations Laboratory.

Cornelius, E.T.,III, & Lyness, K.S. (1980). A Comparison of Holistic and Decomposed Judgement Strategies in Job Analysis by Job Incumbents. Journal of Applied Psychology, Vol. 65, (pp. 155-163).

Fine, S.A. (1975). Functional Job Analysis: An Approach to a Technology for Manpower Planning. Personnel Journal, Vol 53, (pp. 813).

Fine, S.A., & Wiley, W.W. (1971). An Introduction to Functional Job Analysis: A Scaling of Selected Tasks. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Flannagan, J.C. (1954). The Critical Incident Technique. Psychological Bulletin, Vol. 51, (pp. 327-358).

Fleishman, E.R. (1982), Systems for Describing Human Tasks. American Psychologist, Vol. 37, (pp. 1-14).

Fugate, Mary and Ruth Chapman. (1992). Prior Learning Assessment Results of a Nationwide Institutional Survey. Council for Adult and Experiential Learning.

Gael, S. (1983). Job Analysis: A Guide to Assessing Work Activities. San Fancisco, CA: Jossey-Boss.

Harris, C.W., Alkin M.C. & Popham, J.W. (1979). Problems in Criterion-Referenced Measurement. Los Angeles, CA: Center for the Study of Education.

Hogan, J. (1990). Development of a Task Information Taxonomy for Human Performance Systems. Military Psychology, Vol. 2, (pp. 1-19).

Hughes, J.G. (1983). Guide to the Automotive Certification Examination. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Jacobs, Jerald A. . (1992). Certification and Accreditation Law Handbook. Washington, DC: American Society of Association Executives.

Jaeger, R.M. (1991). Selection of Judges for Standard-Setting. Educational Measurement: Issues and Practice, (pp. 3-11).

Kleiman, L.S. & Durham, R.L. Performance Appraisal, Promotion and the Courts. Personnel Psychology, Vol. 34, pp. 103-126.

Kleiman, L.S. & Faley, F. Assessing Content Validity: Standards Set by the Court. Personnel Psychology, Vol. 31, (pp. 701-713).

Kuehn, P.A., Stallings, W.M., & Holland, C.L. (1990). Court-Defined Job Analysis Requirements for Validation of Teacher Certificationn Tests. Educational Measurement: Issues and Practice, (pp. 21-24).

Lad, Lawrence J. DBA. (1992). Current Principles and Practices in Association Self-Regulation. Washington, DC: American Society of Association Executives.

Learning Research and Development Center (1986). Guide to Cognitive Task Analysis. Pittsburgh, PA: Author.

Lee, Howard D. (1989). DACUM Technique: Building A Quality Workforce: A National Priority for the 21st Century Conference. Proceedings of Meetings. Milwaukee, WS: University of Wisconsin-Stout.

Leeuwenburgh, Todd. (1992, November). Quality Standards That Can Open Doors. Nation's Business, pp. 32-33.

Lenn, Marjorie Pease. (1987). Accreditation, Certification and Licensure. in Creating Career Programs in a Lberal Arts Context. San Francisco: Jossey-Bass Publishers.

Linn, R.L. (1991, April). Authentic Assessment: The Rhetoric and the Reality. Chicago, IL: American Education Research Association.

Linn, R.L., Baker, E.L., & Dunbar, S.B. (1990, June). Complex, Performance-Based Assessment: Expections and Validation Outcome. Boulder, CO: ECS/CDE Assessment Conference.

Linn, R.L. (1991, April). Examinations: Validity, Comparability, and Consequences. Paper presented at the American Educational Research Association, Chicago, IL.

Linn, R.L., Baker, E.L., & Dunbar, S.B. (1991). Demands For Performance-Based Assessment: Expectations and Validation Criteria. Educational Researcher, Vol. 20, (pp. 15-21).

McCage, Ronald D. and Brenda C. Hattaway. (1990). V-TECS Product Development Reference Handbook. (Vocational-Technical Education Consortium of States). Decatur, GA: Southern Association of Colleges and Schools.

McCage, Ronald D. and Brenda C. Hattaway. (1992). The New V-TECS Developmental System for Creating or Revising Materials. (Vocational Technical Education Consortium of States). Decatur, GA: Southern Association of Colleges and Schools.

McCormick, E.J., & Dunnette, H.D. (Ed.). (1976). Job Tasks Analysis. Handbook of Industrial and Organizational Psychology. Chicago: Rand McNally.

McCormick, E.J. (1979), Job Analysis: Methods and Applications. New York, NY: AMACOM.

Mecham, R.C., & McCormick, E.D. (1969). The Rated Attribute Requirements of Job Elements of the Position Analysis Questionnaire. Lafayette, IN: Pudue University.

Norton, R.E.. (1989). DACUM Handbook. Leadership Training Series No. 67. Columbus, OH: Ohio State University.

Peters, Roy. (1992). Competency Attainment--A Model for Credentialing. Stillwater, OK: Oklahoma Department of Vocational and Technical Education. .

Pybun, K.M., Jr. (1990). Legal Challenges to Licensing Exams. Educational Measurement: Issues and Practice, (pp. 5-14).

Raynor, P., & Hermann, G. The Relative Effectiveness of the Three Occupational Analysis Methods. The Vocational Aspect of Education, Vol. 40, (pp.47-55).

Reilly, R.R. & Warech, M.A. (1988). The Validity and Fairness of Alternative Procedures of Occupational Preference. Berkeley, CA: Center for Behavioral Studies at the University of California.

Robertson, J.T., & Kandola, R.S. (1982). Work Sample Tests: Validity, Adverse Impact, and Application Reaction. Journal of Occupational Psychology, Vol. 55, (pp, 171-183).

Scruggs, Cathy. (1992). OCAPS, Stillwater, OK: Vocational Instructional Laboratory Ohio State University.

Source materials on Masonry Industry. (1993). International Masonry Institute and Institutional Union of Bricklayers and Allied Craftsman: Washington, DC.

Source Materials on Glass Industry. (1993). National Glass Association: McLean, VA.

Source Materials on Laboring Trends. (1993). Laborers-Associated General Contractors Education and Training Fund: Penbert Center, CT.

Source Materials on Carpentry. (1992). Institutional Brotherhood of Carpenters: Washington, DC.

Steward, Jim. (1992). Mid-America Vocational Currriculum Consortium Development System. Stillwater, OK.

Suen, H.K. (1990). Principles of Test Theories. Hillsdale, NJ: Lawrence Erlbrum Associates, Publishers.

Thompson, D.E., & Thompson, T.A. (1982). Court Standards for Job Analysis in Test Validation. Personnel Psychology, Vol 35, (pp. 865-874).

U.S. Equal Opportunity Commission, U.S. Civil Service Commission, U.S. Department of Labor & U.S. Department of Justice. (1979). Questions and Answers. The Federal Register, Vol. 44, (pp. 11996-12009).

U.S. Equal Opportunity Commission, U.S. Civil Service Commission, U.S. Department of Labor & U.S. Department of Justice. (1978). Uniform Guidelines on Employment Selection Procedures. The Federal Register, Vol. 43, (pp, 38290-38309).

Wainer, H., & Braun, H.I. (1988). Test Validity. Hillsdale, NJ: Laurence Erlbaun Associates.

Wigdor, A.K. and Green, B.F. (Ed.). (1991). Performance Assessment for the Workplace, Vol. II. Washington, DC: National Academy Press.

Willett, J., & Herman, G. (1989). Which Occupational Analysis Technique: Critical Incident, DACUM, and/or Information Search. The Vocational Aspect of Education, Vol. 41, (pp. 79-88).

Wills, Joan L. (1992). The Rambling Path for Certification of Skills. (final version). Washington, DC: Institute for Educational Leadership.

Unpublished Materials

Eshelby, Don. Idaho State Division of Vocational Education Curriculum System. Boise, ID.

Hall, Pat. Florida State System of Competency and Curriculum Development. Tallahassee, FL.

Horton, John. Kentucky Occupational Skill Standards and Testing. Frankfort, KY.

Leppert, Claudia. Oregon State System of Workforce Education. Salem, OR.

Losh, Charles. Arizona State Department of Education Competency and Skills and Curriculum System. Phoenix, AZ.

Nicholson-Tosh, Kathleen. Illinois State Board of Education Competency Based and Curriculum System. Springfield, IL.

Stonehouse, Pat. Georgia Commission on Post Secondary Education Competency-Based System. Atlanta, GA.

Tartell, Jay. (1993). U. S. Air Force Occupational Analysis System. San Antonio, TX.

Woods, D. and J. Davis. (1993). U.S. Navy, Marines and Coast Guard CODAP System. VA.

Legal References

Albermarle Paper Company v. Moody, 422 U.S. 405 (1975).

Allen v. Issac, 39 FEP 1142 (1986).

Anderson v. U.S. Steel Corp., 492 F. 2d. 132 (1979).

Bigby v. City of Chicago, 38 FEP 844 (1984).

Brito v. Zia Company, 478 F. 2d. 1200 (1973).

Burney v. City of Pawtucket, 559 Supp. 1089 (1983).

Chance v. Board of Examiners, 4 FEP 596 (1972).

Easley v. Anheuser-Busch, Inc., 572 F. Supp. 1138 (1983).

Gillespie v. State of Wisconsin, 771 F. 2d. 1035 (1985).

Goldfarb v. Virginia State Bar, 421 U.S. 773 (1975).

Griggs v. Duke Power, 401 U.S. 424 (1971).

Guardians Association of the New York City Police Department v. Civil Service Commission, 630 F. 2d. 79 (1980).

Jones v. Stockham Valves and Fitting Company, 559 F. 2d. 310 (1977).

Kirkland v. New York State Department of Correctional Services, 374 F. Supp. 1361 (1972); (520 F. 2d. 420)

Loiseau v. Department of Human Resources of the State of Oregon, 567 F. Supp. 711 (1983).

Marquez v. Omaha District Sales Office of Ford Motor Company, 440 F. 2d. 1157 (1971).

Robinson v. Union Carbide Corp., 538 F. 2d. 652 (1976).

Schware v. Board of Bar Examiners of State of New Mexico, 353 U.S. 232 (1957).

Thomas v. City of Eronsten, 610 F. Supp. 422 (1985).

United States v. South Carolina, 434 U.S. 1026 (1978).

United States v. City of Chicago, 434 U.S. 875 (1977, 1978).

United States v. City of Chicago (1984).

Vanguard Justice Society v. Hughes, 592 Supp. 245 (1984).

Vulcan Society v. Civil Service Commission, 6 FEP 1045 (1973).

Young v. Edgcomb Steel Company, 499 F. 2d. 97 (1974).

* Note: In addition to the listed bibliography, state materials for the development of competencies, tasks, occupational skills and objectives as well as resulting curriculum and other resource materials, course banks, and testing materials for 50 states and three consortiums were examined. These are not separately identified but are a part of the study developed for the National Association of Vocational-Technical Education Foundation.

Legal References

Albermarle Paper Company v. Moody, 422 U.S. 405 (1975).

Allen v. Issac, 39 FEP 1142 (1986).

Anderson v. U.S. Steel Corp., 492 F. 2d. 132 (1979).

Bigby v. City of Chicago, 38 FEP 844 (1984).

Brito v. Zia Company, 478 F. 2d. 1200 (1973).

Burney v. City of Pawtucket, 559 Supp. 1089 (1983).

Chance v. Board of Examiners, 4 FEP 596 (1972).

Easley v. Anheuser-Busch, Inc., 572 F. Supp. 1138 (1983).

Gillespie v. State of Wisconsin, 771 F. 2d. 1035 (1985).

Goldfarb v. Virginia State Bar, 421 U.S. 773 (1975).

Griggs v. Duke Power, 401 U.S. 424 (1971).

Guardians Association of the New York City Police Department v. Civil Service Commission, 630 F. 2d. 79 (1980).

Jones v. Stockham Valves and Fitting Company, 559 F. 2d. 310 (1977).

Kirkland v. New York State Department of Correctional Services, 374 F. Supp. 1361 (1972); (520 F. 2d. 420)

Loiseau v. Department of Human Resources of the State of Oregon, 567 F. Supp. 711 (1983).

Marquez v. Omaha District Sales Office of Ford Motor Company, 440 F. 2d. 1157 (1971).

Robinson v. Union Carbide Corp., 538 F. 2d. 652 (1976).

Schware v. Board of Bar Examiners of State of New Mexico, 353 U.S. 232 (1957).

Thomas v. City of Eronsten, 610 F. Supp. 422 (1985).

United States v. South Carolina, 434 U.S. 1026 (1978).

United States v. City of Chicago, 434 U.S. 875 (1977, 1978).

United States v. City of Chicago (1984).

Vanguard Justice Society v. Hughes, 592 Supp. 245 (1984).

Vulcan Society v. Civil Service Commission, 6 FEP 1045 (1973).

Young v. Edgcomb Steel Company, 499 F. 2d. 97 (1974).

APPENDIX A

LIST OF ORGANIZATIONS UNDER CONTRACT WITH FEDERAL GOVERNMENT TO DEVELOP SKILL STANDARDS

DEPARTMENT OF EDUCATION AWARDS (Round 1)

GRANTEE	SCOPE
Foundation for Industrial Modernization Washington, DC	Computer-aided drafting (cluster of occupations)
Education Development Center Newton, Massachusetts	Biotechnical sciences (laboratory technicians)
Far West Lab for Educational Research and Development San Francisco, California	Health science and technology (occupational clusters)
National Automotive Technicians Education Foundation Herndon, Virginia	Automotive, auto body and truck (technicians)
Graphic Arts Technical Foundation Pittsburgh, Pennsylvania	Printing (occupational clusters)
Electronic Industries Foundation Washington, DC	Electronics (technicians)
Vocational Technical Education Consortium of States (V-TECS) Decatur, Georgia	Air conditioning, refrigeration and power

DEPARTMENT OF EDUCATION AWARDS (Round 2)

GRANTEE	SCOPE
Foundation for Industrial Modernization Washington, DC	Advanced Manufacturing
Human Services Research Institute Cambridge, Massachusetts	Human Services Occupations

DEPARTMENT OF EDUCATION AWARDS (Round 2 Continued)

Laborers-AGC Education and Training Fund Pomfret Center, CT	Health science and technology (occupational clusters)
American Chemical Society Washington, DC	Chemical Process Industries
Center for Occupational Research & Development Waco, Texas	Hazardous Materials Management Technician
Center for Occupational Research & Development Waco, Texas	Photonics Technician
American Welding Society Miami, Florida	Welding
Grocers Research and Education Fund Sterling, Virginia	Food Marketing Industry
National FFA Foundation Madison, Wisconsin	Agriscience/Biotechnology

US DEPARTMENT OF LABOR AWARDS

Institute of Industrial Launderers Washington, DC	Industrial Launderers
Council on Hotel, Restaurant and Institutional Education Washington, DC	Tourism, Travel and Hospitality
National Tooling and Machining Association Ft. Washington, Maryland	Metalworking
American Electronics Association Santa Clara, California	Electronics
National Electrical Contractors Association Bethesda, Maryland	Electrical Construction
National Retail Federation Washington, DC	Retail Trade

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